

TriMet

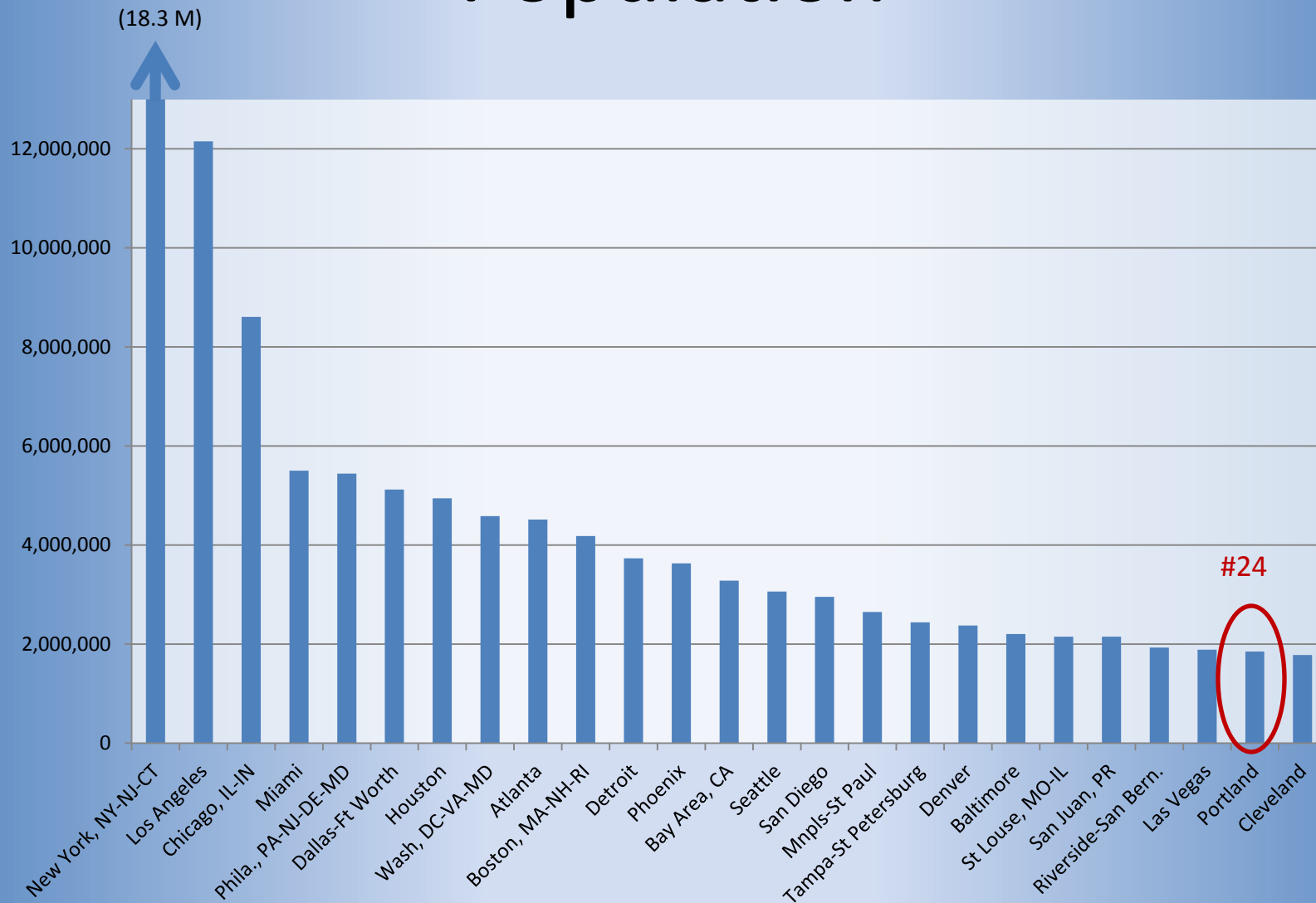
Core Capacity Concepts

TriMet Board
January 25, 2017

Regional Growth

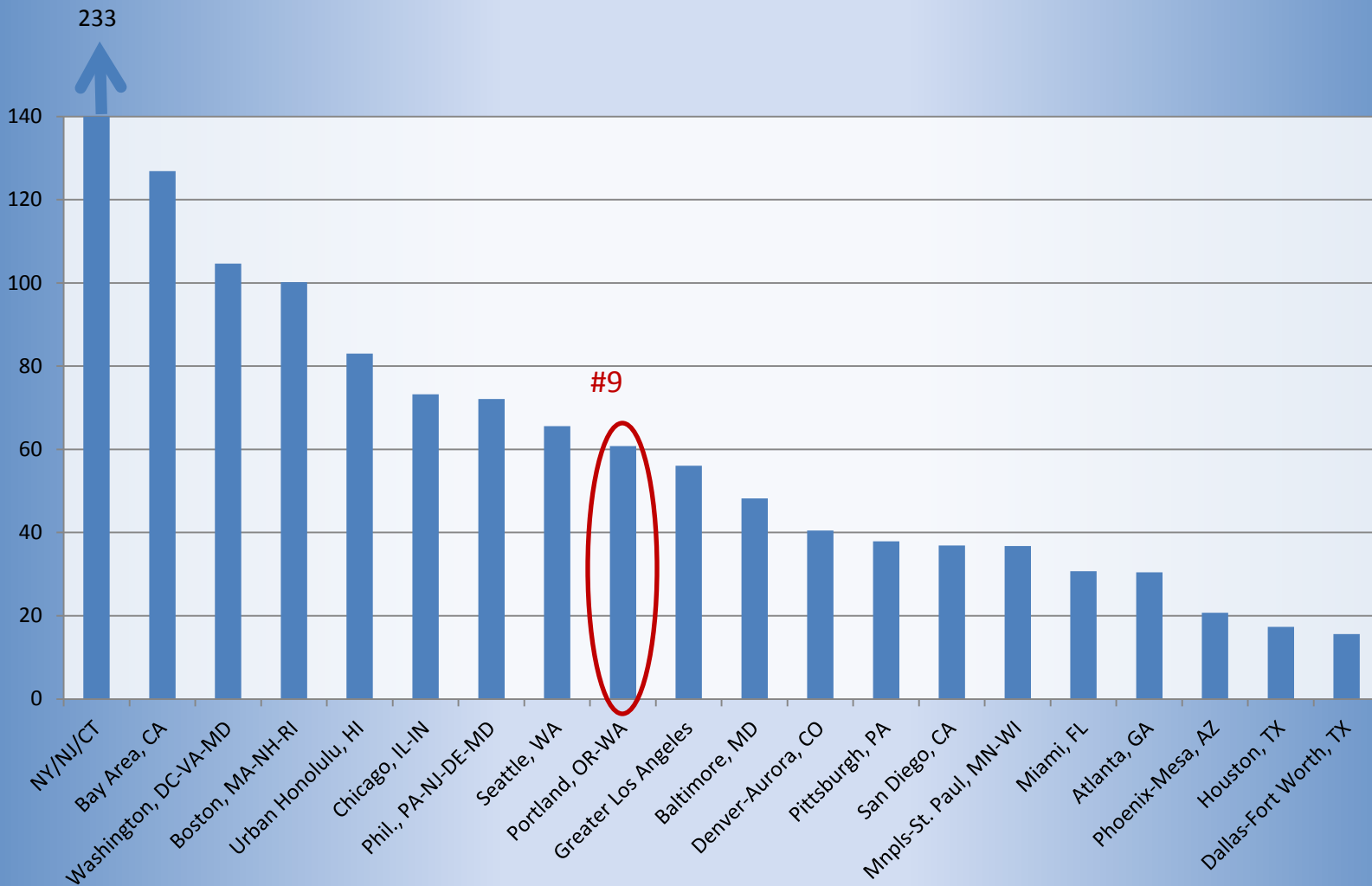
- 400,000 more people and 260,000 more jobs in less than 20 years
- Concentrated in Regional Centers, Town Centers, Station Areas, and Main Streets
- \$13.1 billion worth of development in station areas since decision to build
- 5% of the area (MAX station areas) had 39% of all the housing units developed on it since the decision to build each line

Population



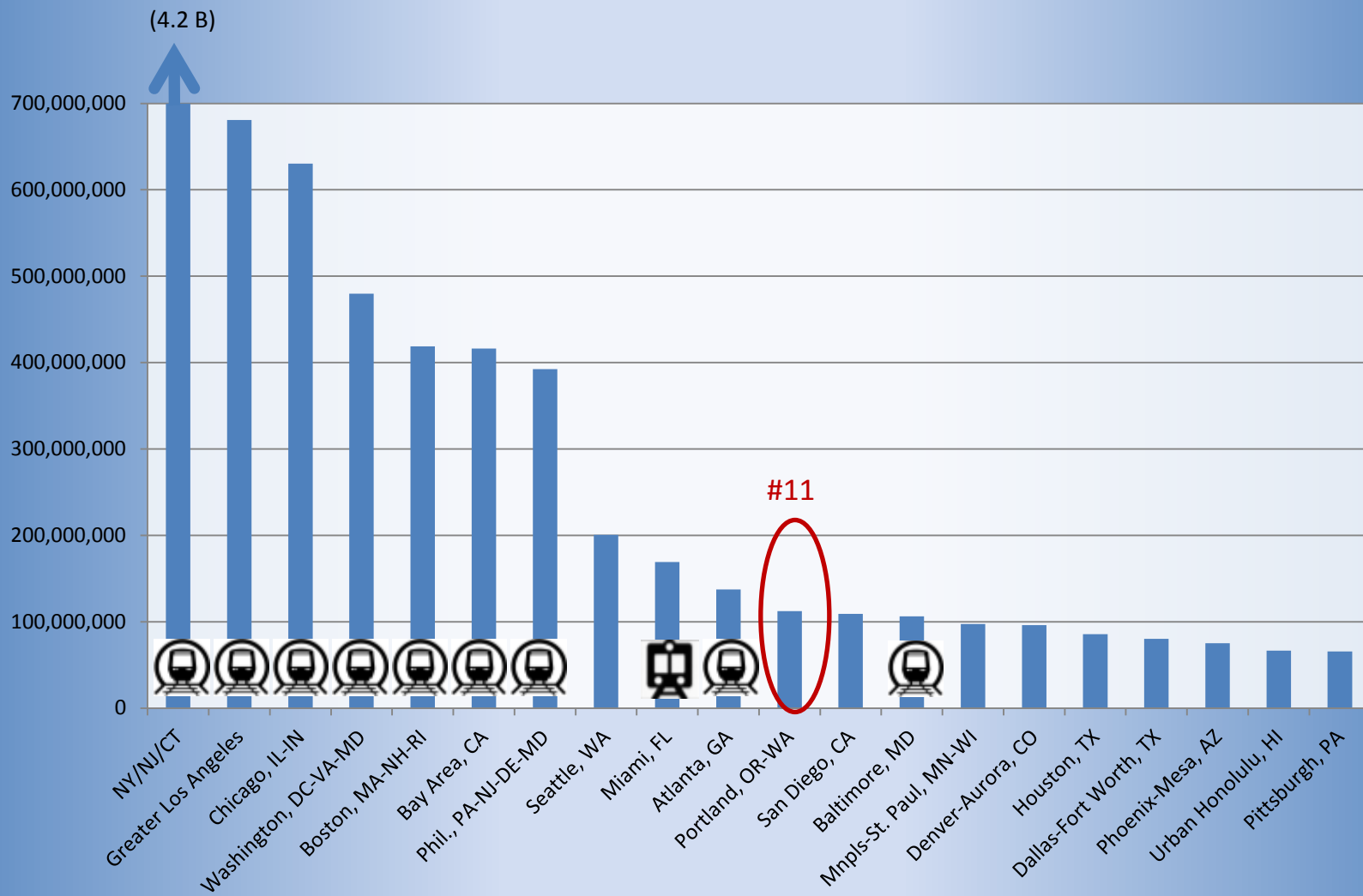
Source: NTD 2014

Boardings per Capita



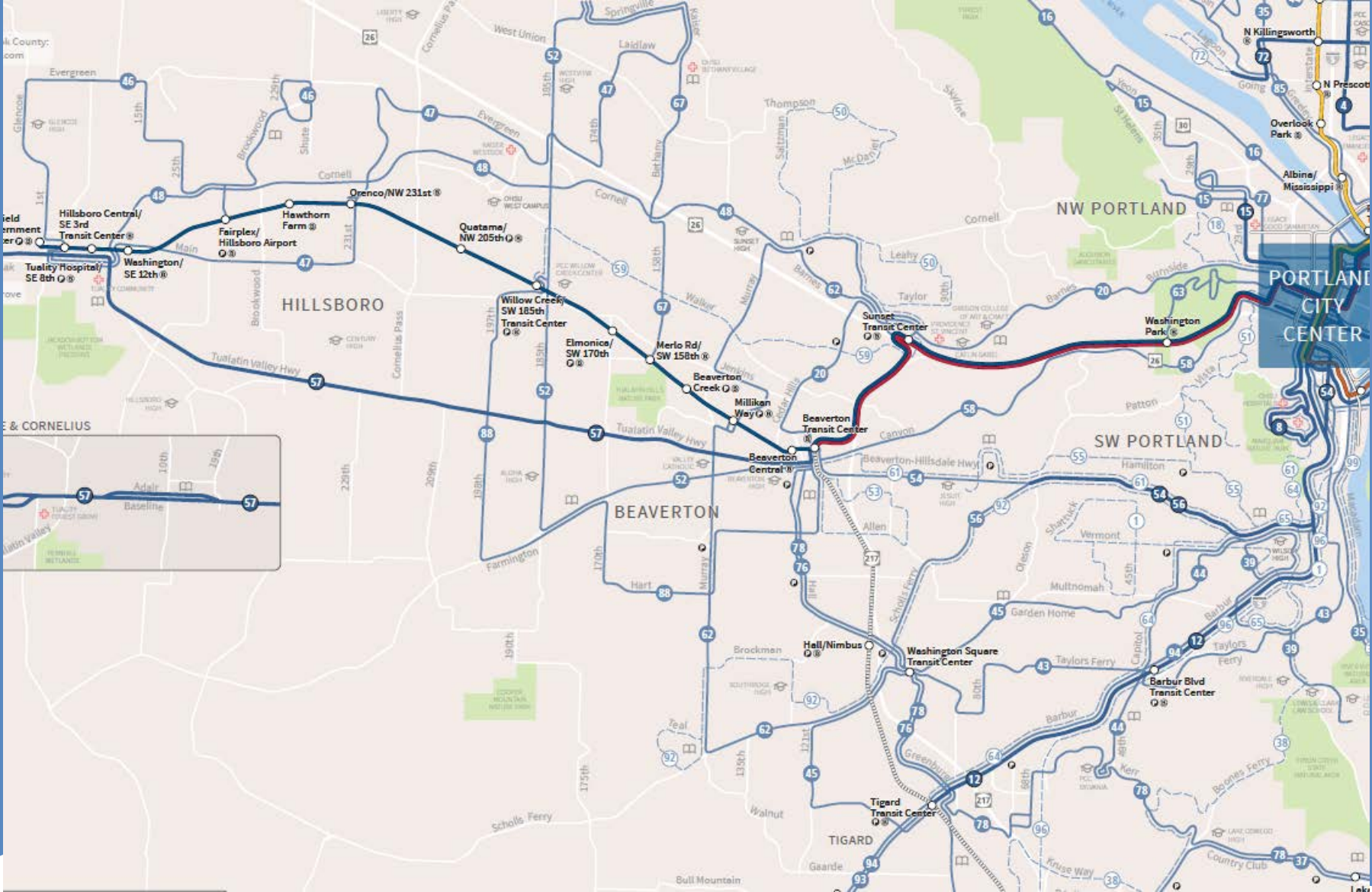
Source: NTD 2014

Boardings



Source: NTD 2014

More than 3 VMT saved for every 1 mile ridden on Westside MAX



Transit and Development - Westside



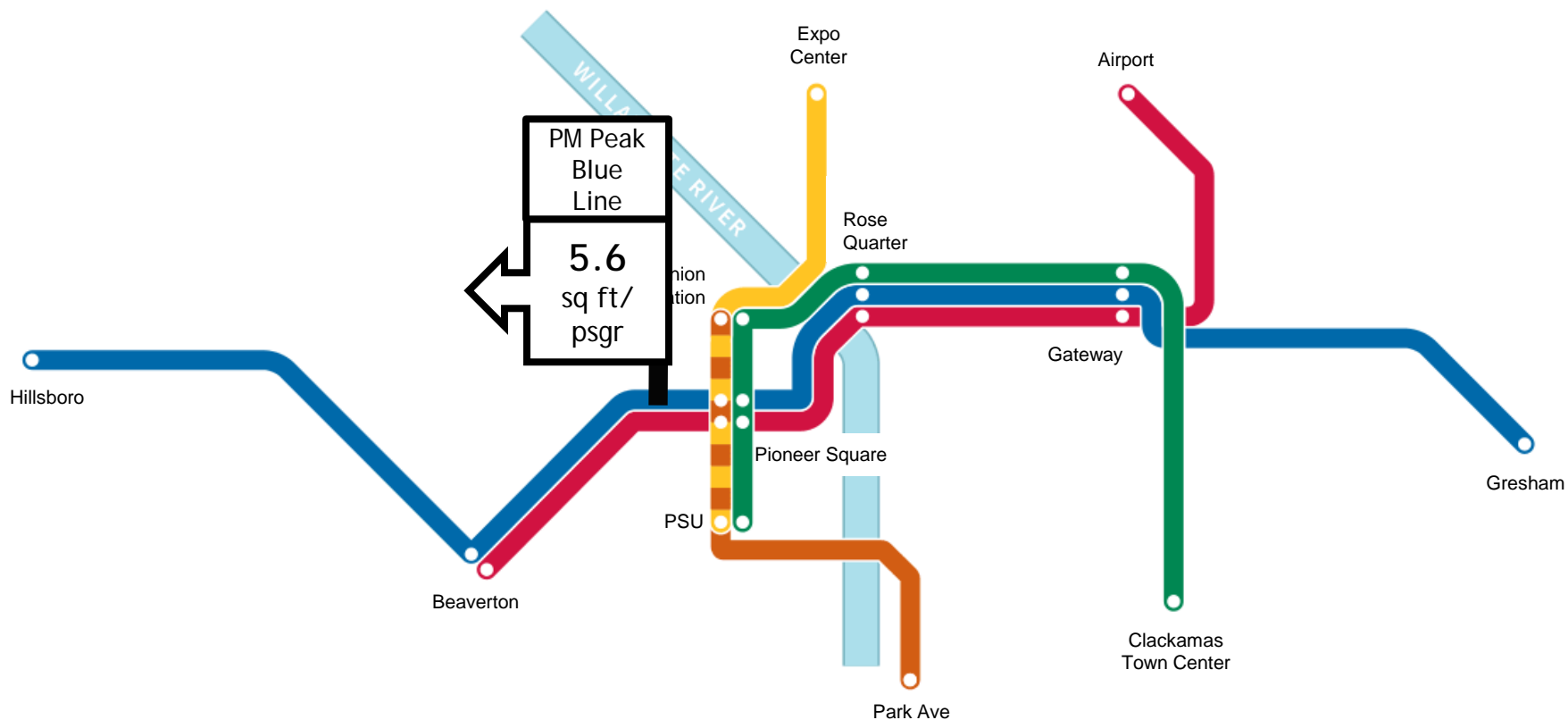
Busy Trains



Reliability and Capacity

- When uneven headways occur, some trips are extra busy
- Original MAX system design started about 35 years ago. Growth forces systems to mature and adapt.
- We're doing our part on the operations side, but we can seek help with trackwork, switches, signals, junctions, stations and other infrastructure

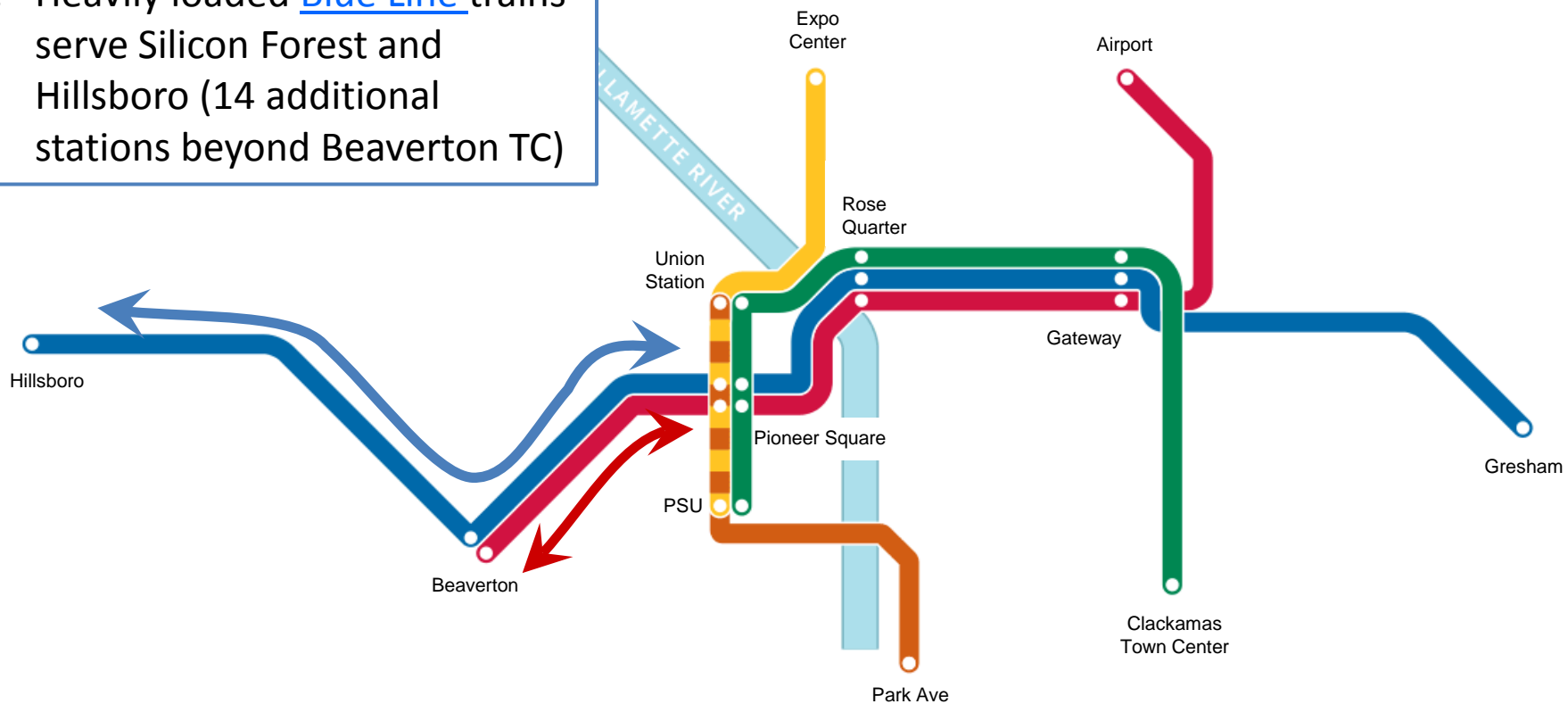
Blue Line Westbound is *At Capacity* within 5 years according to FTA Core Capacity Criteria



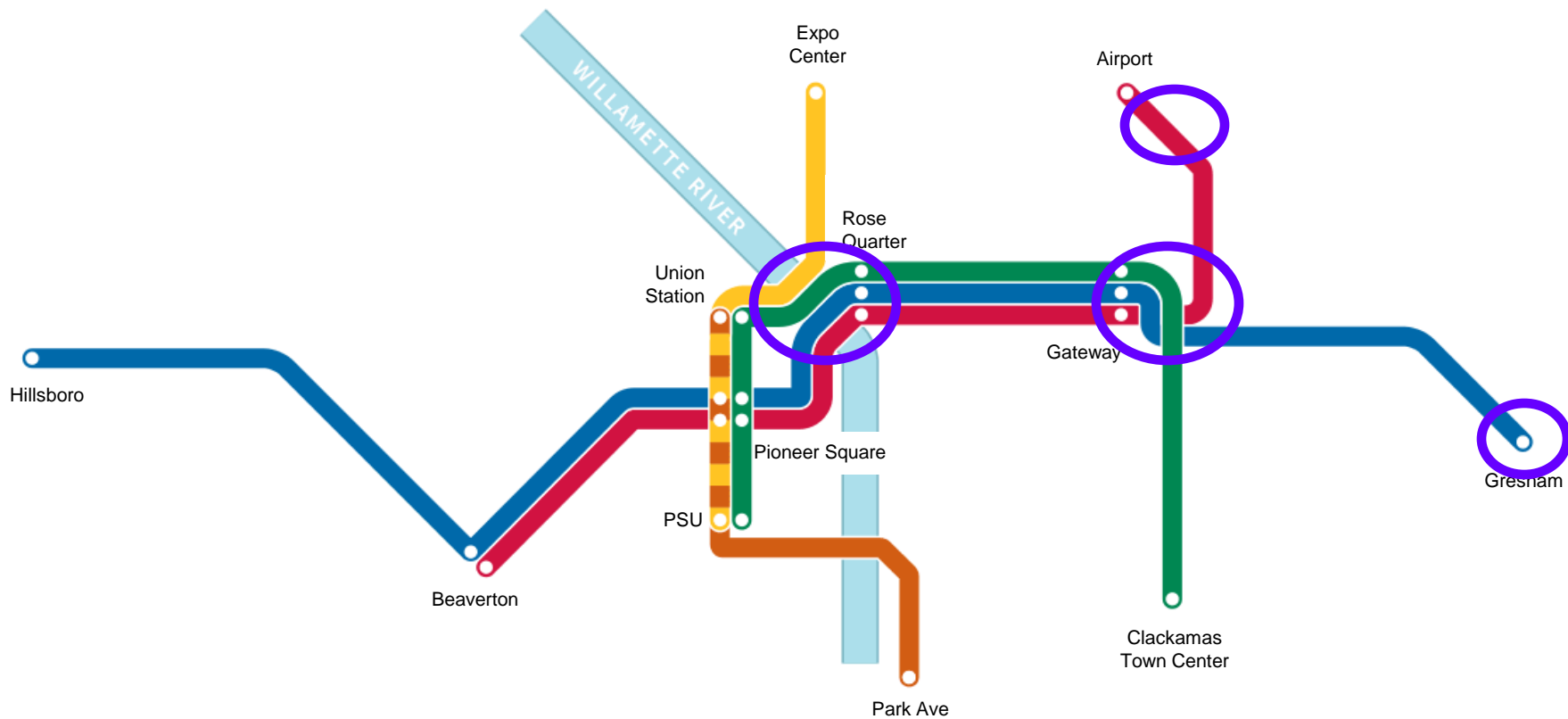
FTA Threshold: 5.7 sq ft/psgr or less = at capacity within 5 years
5.6 sq ft/psgr = "medium" rating for project need

Two Different Markets

1. Less busy Red Line trains serve as far as Beaverton TC (3 stations on westside)
2. Heavily loaded Blue Line trains serve Silicon Forest and Hillsboro (14 additional stations beyond Beaverton TC)

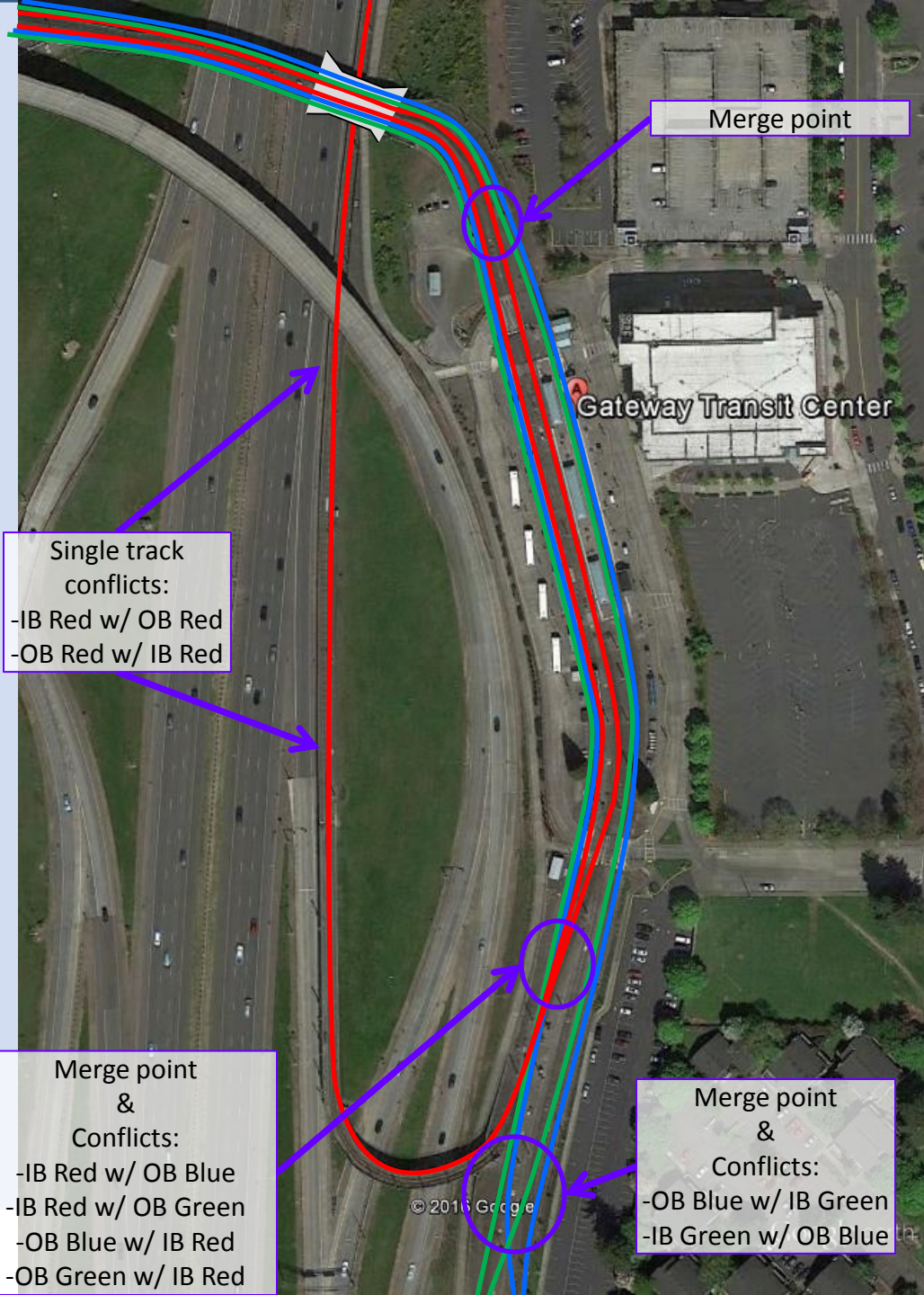


Key locations in a growing system



Gateway Junction

- Single-track section
- 498 trains per day in all directions



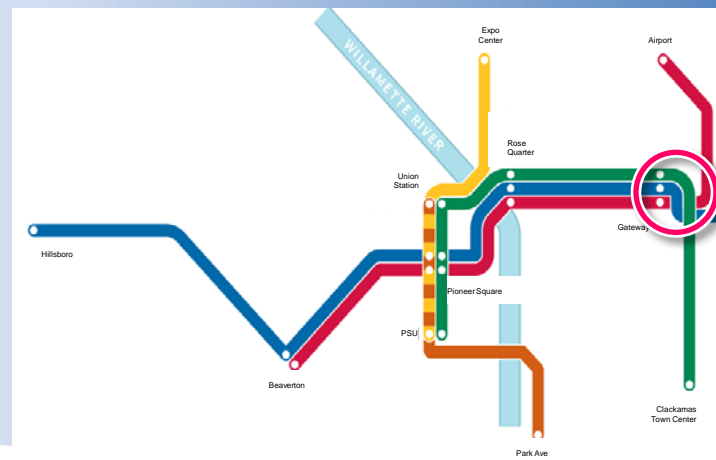
Gateway Transit Center

Departure from Ruby Junction	Departure from Clackamas Town Center	Departure from PDX	Arrival at Gateway	
				5:00 PM
4:42 PM			5:01 PM	5:01 PM
				5:02 PM
	4:46 PM		5:03 PM	5:03 PM
				5:04 PM
				5:05 PM
4:48 PM			5:06 PM	5:06 PM
				5:07 PM
				5:08 PM
				5:09 PM
				5:10 PM
				5:11 PM
		4:57 PM	5:12 PM	5:12 PM
				5:13 PM
				5:14 PM
4:57 PM			5:15 PM	5:15 PM
				5:16 PM
				5:17 PM
	5:01 PM		5:18 PM	5:18 PM
				5:19 PM
				5:20 PM
5:02 PM			5:21 PM	5:21 PM
				5:22 PM
				5:23 PM
				5:24 PM
				5:25 PM
				5:26 PM
		5:12 PM	5:27 PM	5:27 PM
				5:28 PM
				5:29 PM
5:11 PM			5:30 PM	5:30 PM

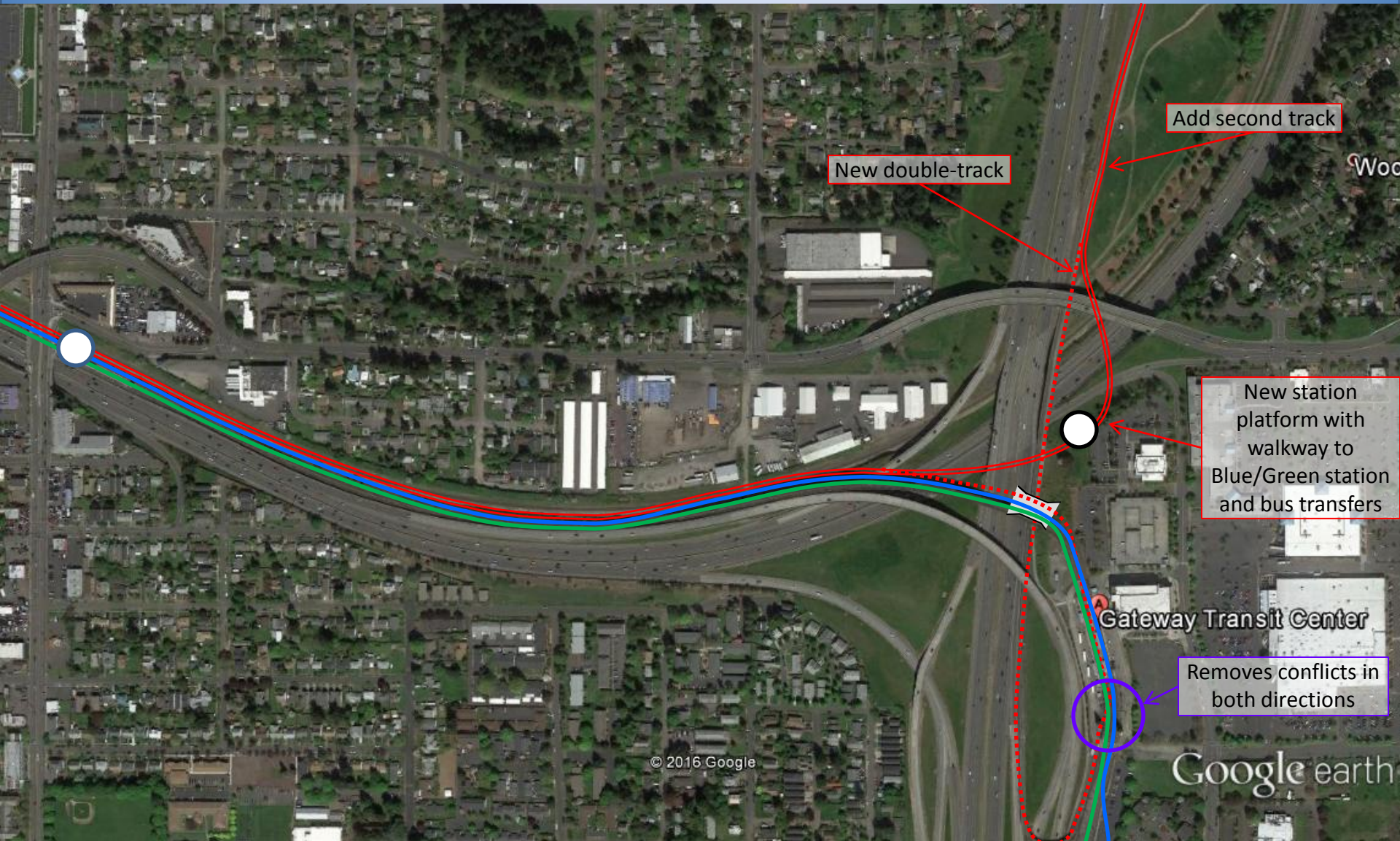
Window needs to stay open to leave gap for Yellow Line merge at Steel Bridge

Window needs to stay open to leave gap for Yellow Line merge at Steel Bridge

- Currently 2+ minute buffer required between trains
- Only 2 obvious windows between 5-5:30 PM without additional capacity improvements



Gateway Double-Track & Station Concept



New double-track

Add second track

New station platform with walkway to Blue/Green station and bus transfers

Removes conflicts in both directions

Gateway Transit Center

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Google earth

Another Gateway Option for Discussion



New 2nd-track

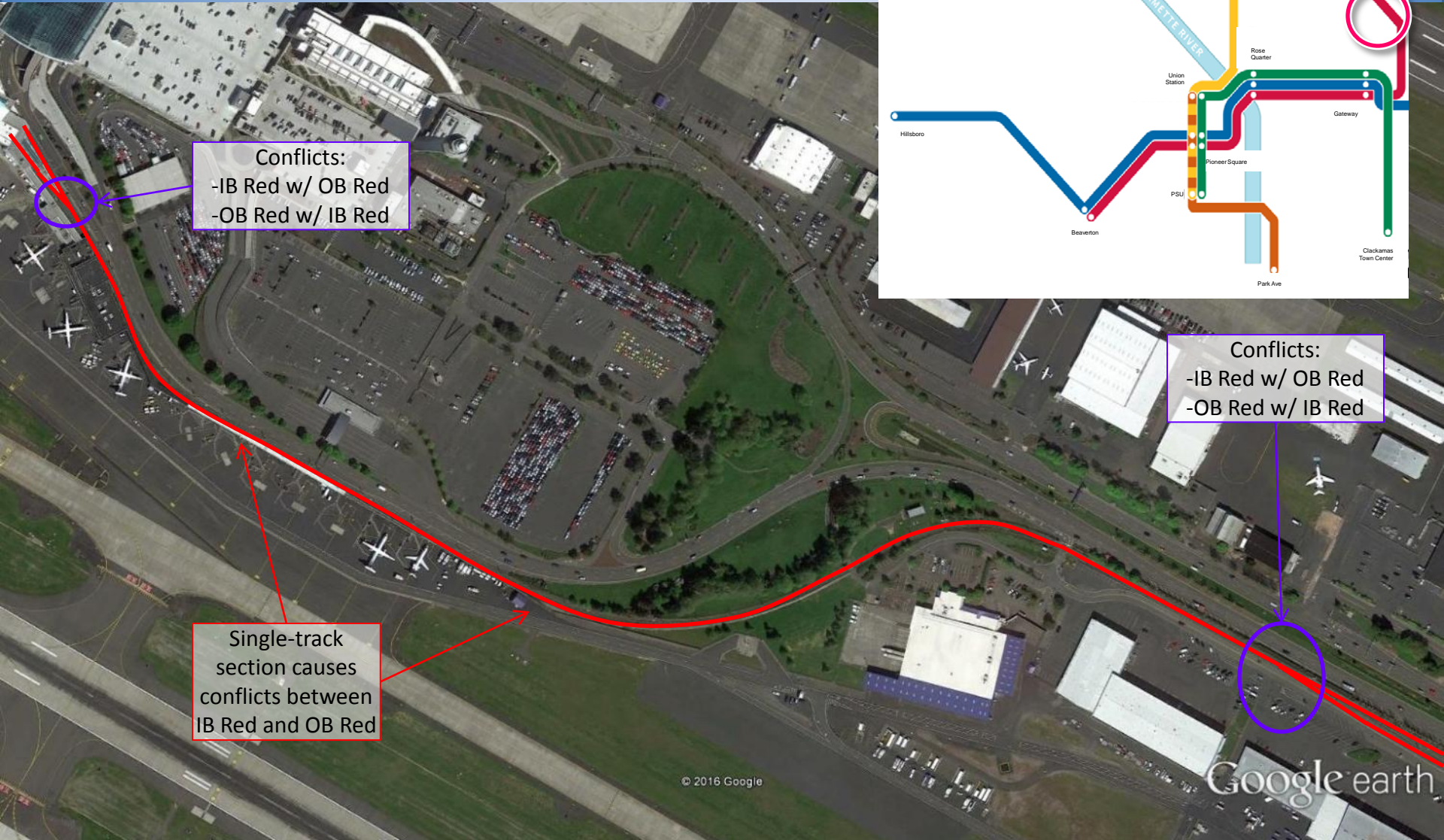
Gateway Transit Center

Removes conflicts in both directions

© 2016 Google

Google earth

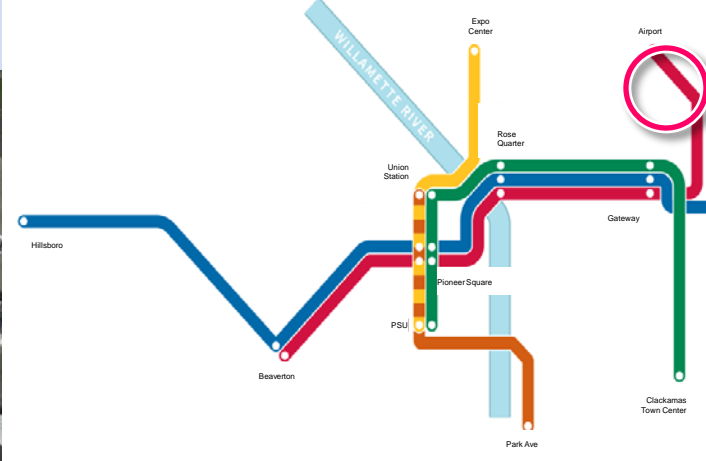
Airport Single Track



Conflicts:
-IB Red w/ OB Red
-OB Red w/ IB Red

Single-track section causes conflicts between IB Red and OB Red

Conflicts:
-IB Red w/ OB Red
-OB Red w/ IB Red



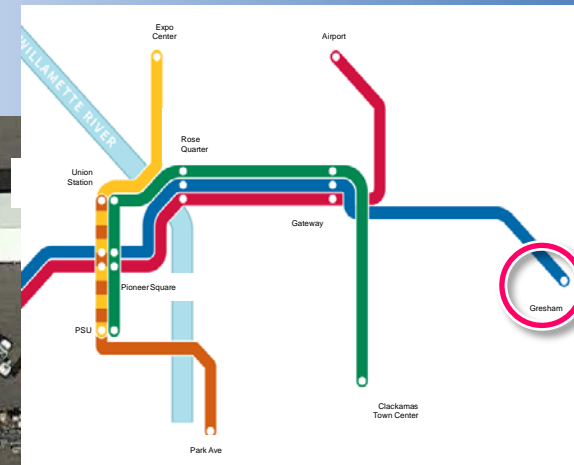
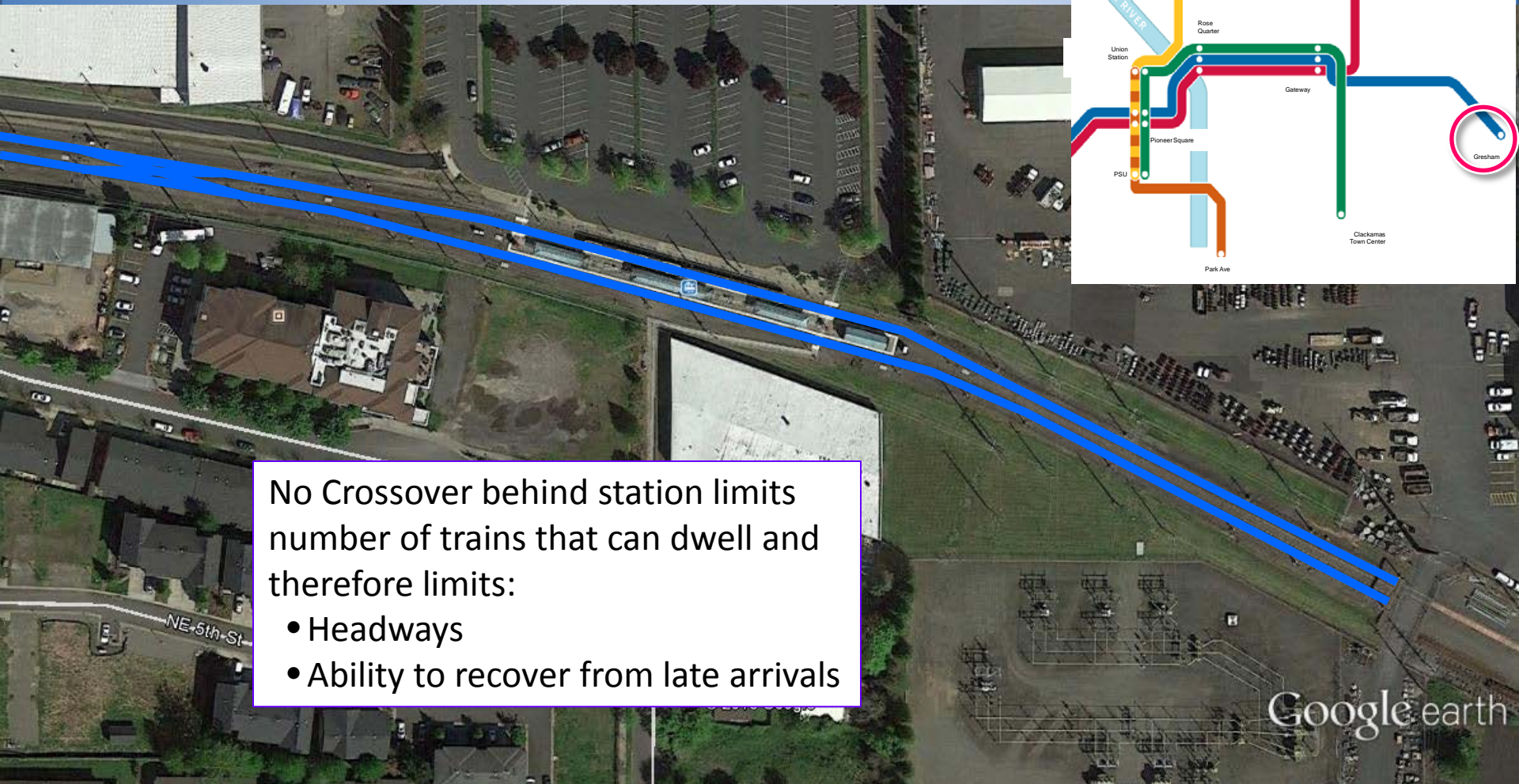
Airport Double Track



Gateway and Airport Interact

- [Airport animation](#)
- [Gateway animation](#)

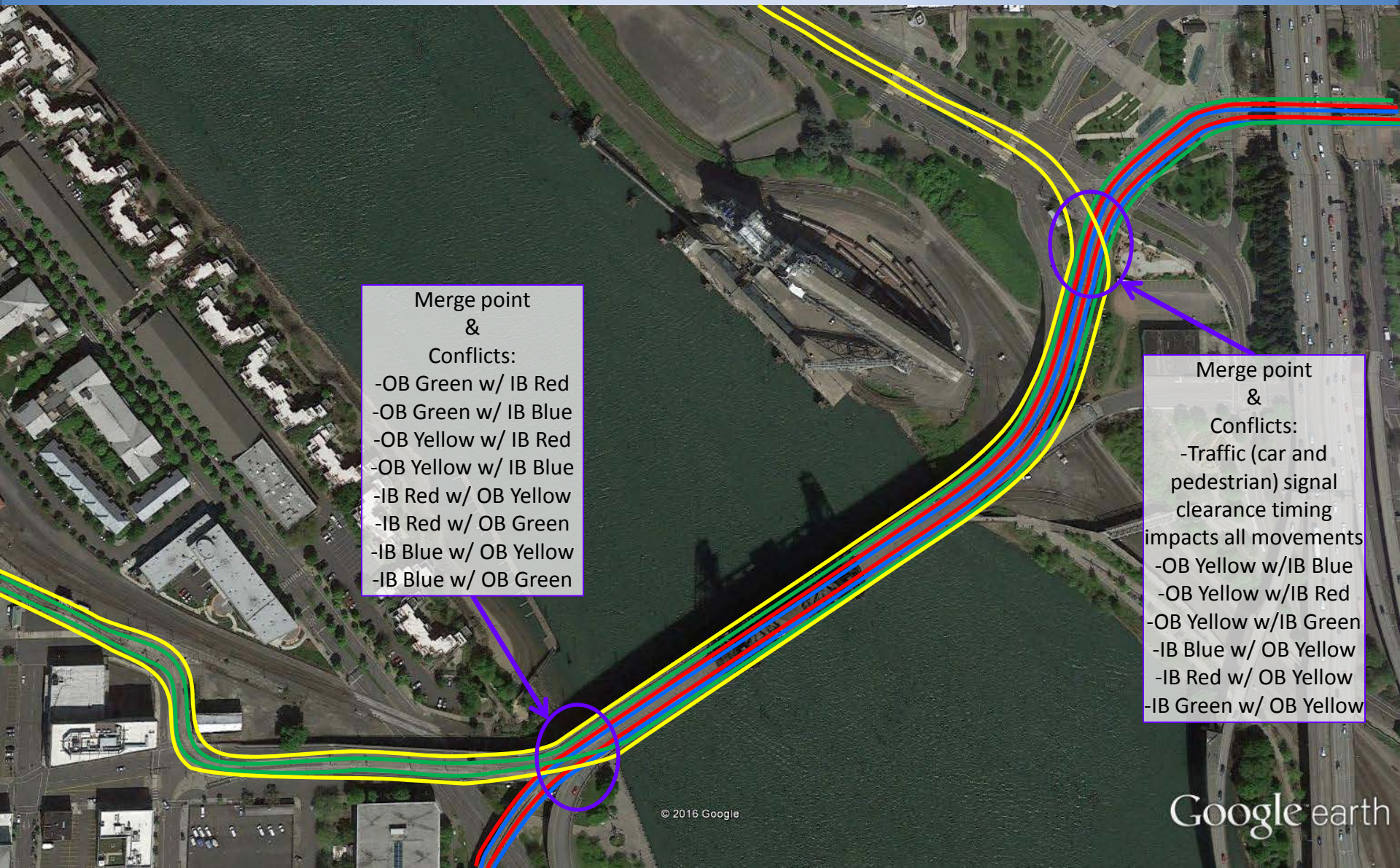
Cleveland MAX Station Layover & Recovery



No Crossover behind station limits
number of trains that can dwell and
therefore limits:

- Headways
- Ability to recover from late arrivals

Rose Quarter/Steel Bridge



Merge point
&

Conflicts:

- OB Green w/ IB Red
- OB Green w/ IB Blue
- OB Yellow w/ IB Red
- OB Yellow w/ IB Blue
- IB Red w/ OB Yellow
- IB Red w/ OB Green
- IB Blue w/ OB Yellow
- IB Blue w/ OB Green

Merge point
&

Conflicts:

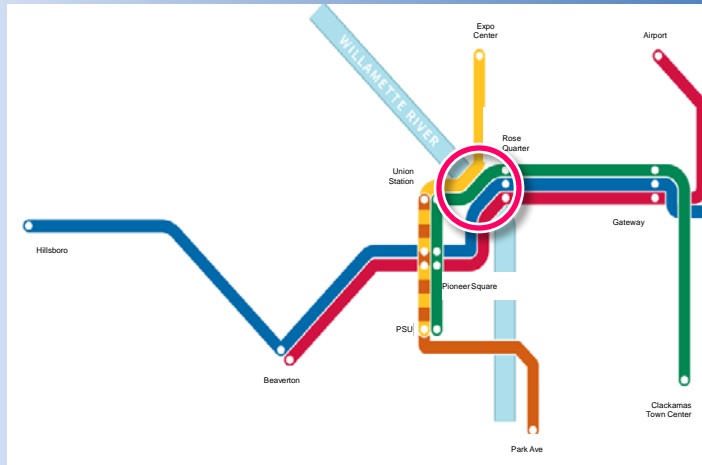
- Traffic (car and pedestrian) signal clearance timing impacts all movements
- OB Yellow w/IB Blue
- OB Yellow w/IB Red
- OB Yellow w/IB Green
- IB Blue w/ OB Yellow
- IB Red w/ OB Yellow
- IB Green w/ OB Yellow

Schedule Overlap Limits Resiliency

	Gateway	Rose Quarter	Steel Bridge	Providence Park	Beaverton TC	Hillsboro/Hatfield
5:08 PM						
5:09 PM						
5:10 PM	Yellow	5:25 PM	5:26 PM			
5:11 PM						
5:12 PM	5:12 PM Red	5:27 PM	5:28 PM	5:42 PM	6:00 PM	
5:13 PM						
5:14 PM						
5:15 PM	5:15 PM Blue	5:30 PM	5:31 PM	5:45 PM	6:03 PM	6:33 PM
5:16 PM						
5:17 PM						
5:18 PM	5:18 PM Green	5:33 PM	5:34 PM			
5:19 PM						
5:20 PM						
5:21 PM	5:21 PM Blue	5:36 PM	5:37 PM	5:51 PM	6:09 PM	6:38 PM
5:22 PM						
5:23 PM						
5:24 PM						
5:25 PM	Yellow	5:40 PM	5:41 PM			
5:26 PM						
5:27 PM	5:27 PM Red	5:42 PM	5:43 PM	5:57 PM	6:15 PM	
5:28 PM						
5:29 PM						
5:30 PM	5:30 PM Blue	5:45 PM	5:46 PM	6:00 PM	6:18 PM	6:47 PM
5:31 PM						
5:32 PM						
5:33 PM	5:33 PM Green	5:48 PM	5:49 PM			
5:34 PM						
5:35 PM						
5:36 PM	5:36 PM Blue	5:51 PM	5:52 PM	6:06 PM	6:24 PM	6:53 PM

- 606 trains/day in all directions through Rose Quarter/Steel Bridge on average weekday

Window for another train – less resilient to delay without further capacity and reliability improvements



Rose Quarter/Steel Bridge Process

- Multiple options
- Long-term conceptual analysis underway



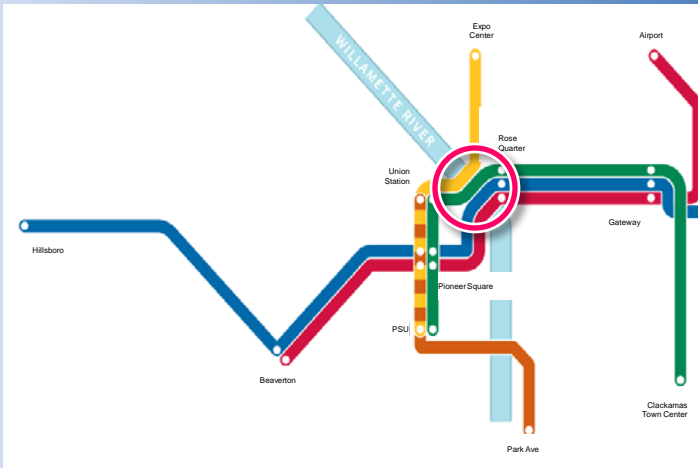
Idealized Concept for Rose Quarter/Steel Bridge

- Separate the lines – minimize conflicts and maximize the capacity
- Yellow completely separate from Blue/Red
- Consider reconfiguring RQ station to allow Green Line to separate before RQ station

Current Steel Bridge/RQ

	<u>Gateway</u>	<u>Rose Quarter</u>	<u>Steel Bridge</u>	<u>Providence Park</u>	<u>Beaverton TC</u>	<u>Hillsboro</u>
5:08 PM						
5:09 PM						
5:10 PM	Yellow	5:25 PM	5:26 PM			
5:11 PM						
5:12 PM	5:12 PM Red	5:27 PM	5:28 PM	5:42 PM	6:00 PM	
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5:14 PM						
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5:16 PM						
5:17 PM						
5:18 PM	5:18 PM Green	5:33 PM	5:34 PM			
5:19 PM						
5:20 PM						
5:21 PM	5:21 PM Blue	5:36 PM	5:37 PM	5:51 PM	6:09 PM	6:38 PM
5:22 PM						
5:23 PM						
5:24 PM						
5:25 PM	Yellow	5:40 PM	5:41 PM			
5:26 PM						
5:27 PM	5:27 PM Red	5:42 PM	5:43 PM	5:57 PM	6:15 PM	
5:28 PM						
5:29 PM						
5:30 PM	5:30 PM Blue	5:45 PM	5:46 PM	6:00 PM	6:18 PM	6:47 PM
5:31 PM						
5:32 PM						
5:33 PM	5:33 PM Green	5:48 PM	5:49 PM			
5:34 PM						
5:35 PM						
5:36 PM	5:36 PM Blue	5:51 PM	5:52 PM	6:06 PM	6:24 PM	6:53 PM

Window for another train – less resilient to delay without further capacity and reliability improvements

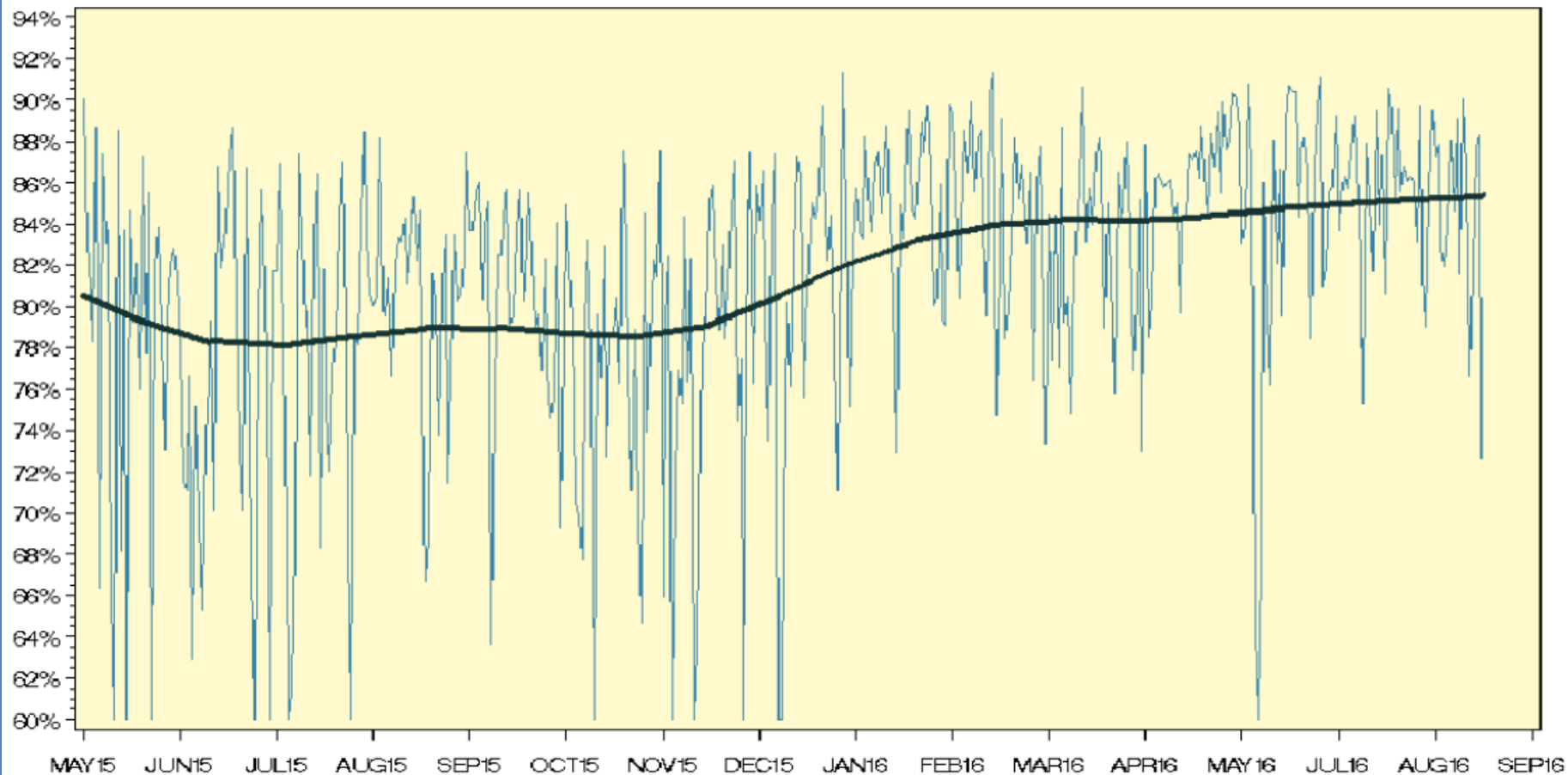


More vehicles & Storage track

- LRVs for more MAX service
- Ruby Junction expansion to store them

We're making the Operational Improvements – but can seek FTA help with Capital Improvements

MAX On Time Performance



Potential Grant Sources

- 5309 Capital Investment Grant opportunities