
THE CASCADIA

# The CHSR Miles from Portland, OR, to Seattle  Central Station

- CHSR miles between Portland, Oregon, Rose Quarter, and Longview, WA, on the ground is 9.66 miles, on flyovers is 20.69 miles, and in tunnels is 12.81  miles,  a total of 43.16 miles.

- CHS miles between Longview and Centralia, on the ground, is 11.82 miles, on flyovers are 17.62 miles, and in tunnels, it is 12.62 miles, a total of 42.06 miles.

- CHSR miles between Centralia and Tacoma, on the ground, is 17.36 miles, on flyovers are 7.73 miles, and in tunnels, it is 21.77 miles. A total of 46.86 miles.

- CHSR between Tacoma and Seattle Central station/hub, on the ground, is 4.06 miles; on flyovers, 17.81 miles,  and in tunnels, 13.03 miles. A total of  34.90 miles. SEA/TAC link: on the flyover, 3.74 miles; in the tunnel, 4.00 miles. A total of 7.74 miles. The total from Portland to Seattle direct is 161.29 miles; via SEA/TAC, it is 140.63 miles.

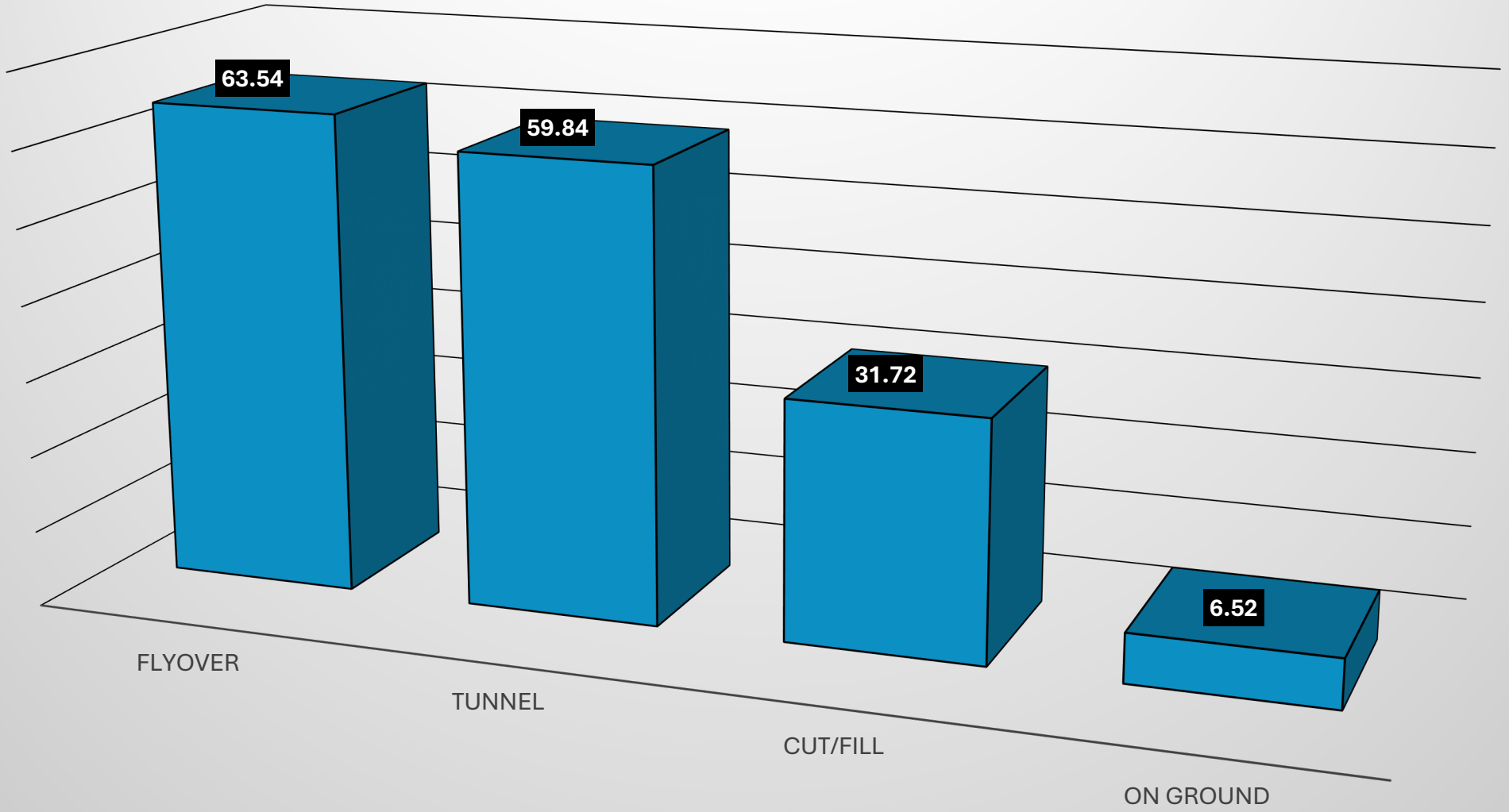
- Portland, Amtrak Station to Seattle King Amtrak Station is 187.00 miles long, the CHSR direct is ± 25.71 (22.34) miles shorter, and via SEA/TAC, it is 3.37.

# The CHSR Miles from Portland Rose Quarter Station/Hub, OR, to Seattle  Central Station

- CHSR miles between Portland, Oregon, Rose Quarter, and Seattle Central station/hub on flyovers are 63.54 miles; in tunnels are 59.84 miles; in cut/fill are 31.72 miles; and on the ground are 6.52 miles, for a total of 161.62 miles.
- CHSR via SEA/TAC: on the flyover, it is 3.74  miles, and in the tunnel, it is 4.00 miles, for a total of 169.03 miles.
- Portland Rose Quarter to Portland Airport (PDX) : on the ground, it is 0.61 miles; on flyovers, it is 7.46 miles; and in the tunnel, it is 1.43 miles.
- Amtrak to King Station is 187 miles long; the CHSR direct is ± 25.38 miles shorter, and via SEA/TAC, it is 17.97 miles shorter.
- The percentages in the Columned charts are rounded.

# CHSR

## Between Portland, OR and Seattle Central, WA




| | Flyover | | Tunnel | | Cut/Fill | | On Ground | |
|---|---|---|---|---|---|---|---|---|
| Series 1 | 63.54 | 39.31% | 59.84 | 37.02% | 31.72 | 19.62% | 6.52 | 4.05% |

# Legend

 CHSR Station in Tunnel

 CHSR Station on Flyovers

 CHSR Station on Ground

On ground

Cuts

Fills

Flyovers

Tunnels

Existing Freight Railroads, other than BNSF and UP RR

Existing Freight Railroads

C-ICE: Cascadia Inter-City Express

CCE: Cascadia Commuter Express

HSR Legend 08
Des by RN/BCP

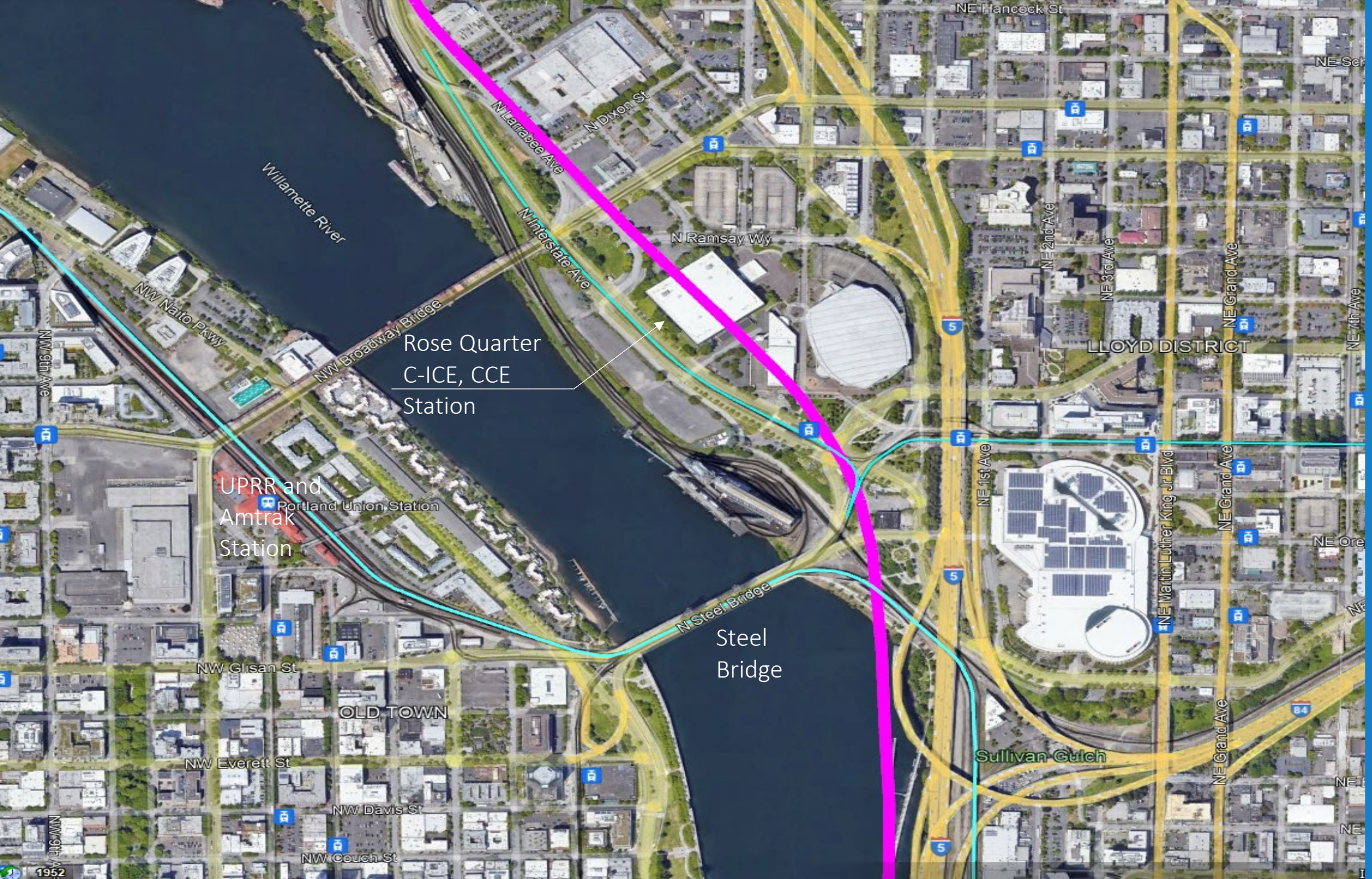

CHSR Corridor between Portland and Seattle

The BNSF freight corridor is 150 years old and has too many tight curves, grade crossings, and small towns to develop HSR technology.

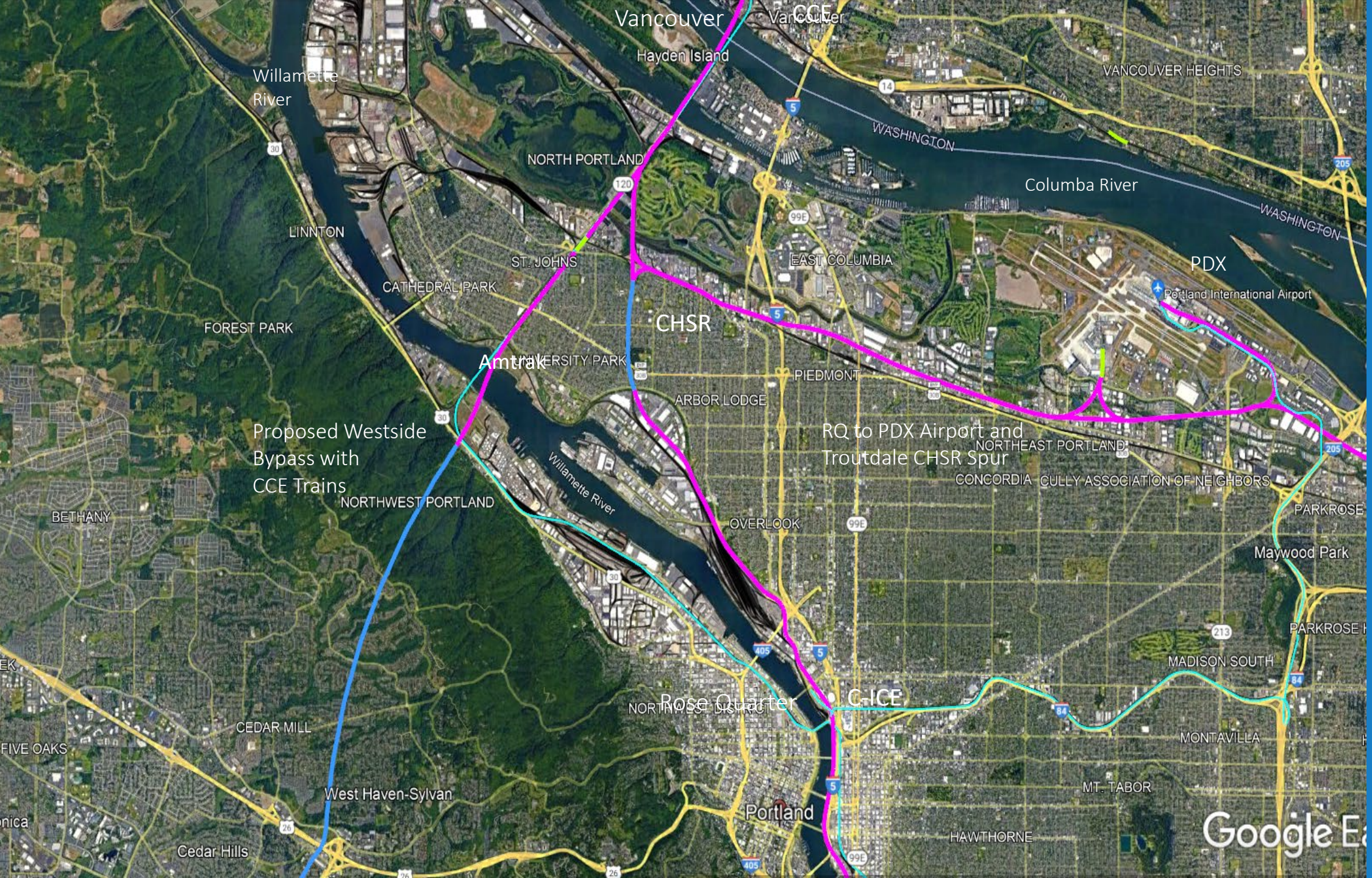

## Rose Quarter Bullet Train Station, Former Veterans Memorial Coliseum

This station will serve Cascadia Inter City Express Trains (C-ICE) and Cascadia Commuter Express Trains (C-CE)

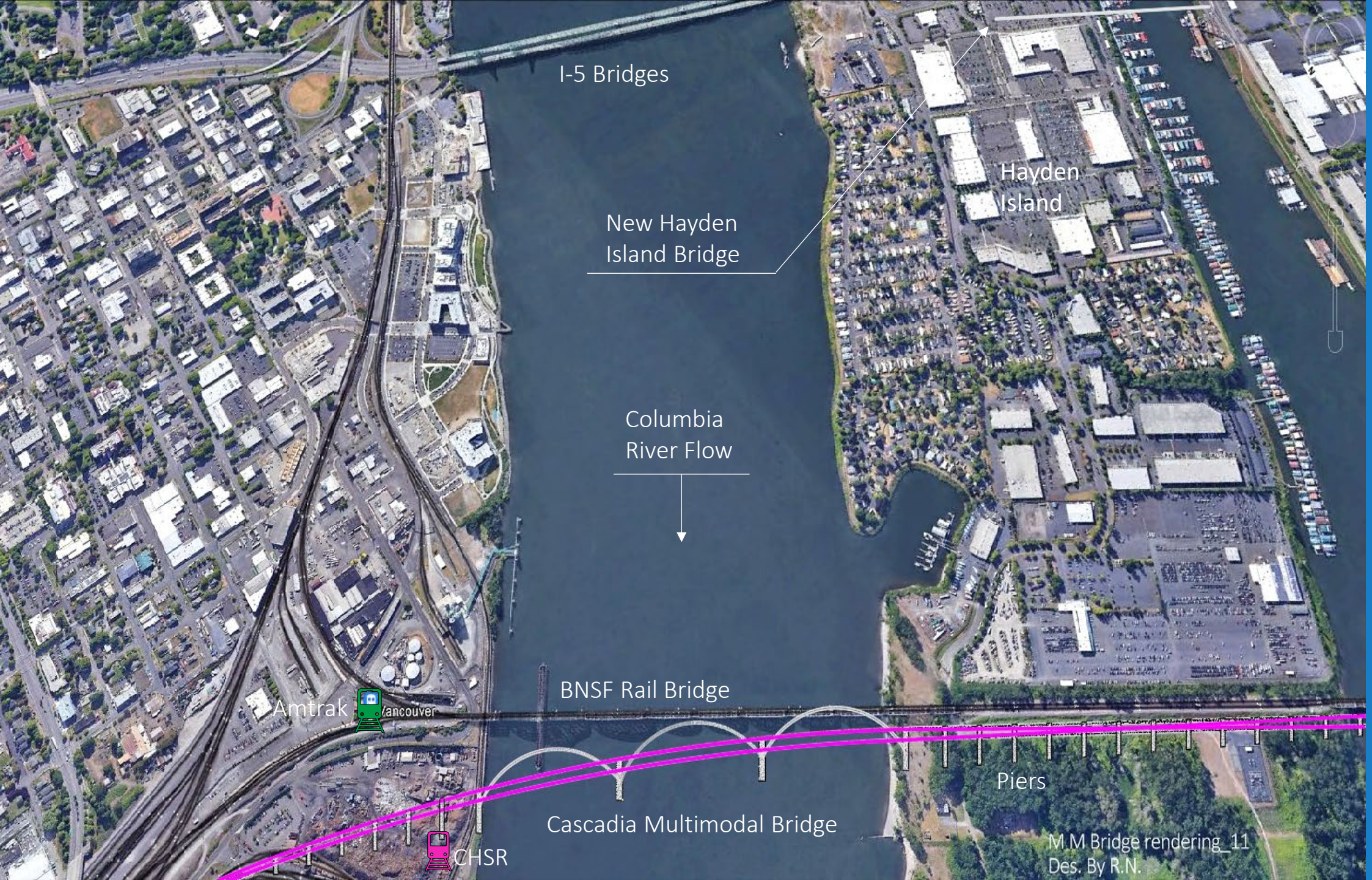
This station is above ground to eliminate all roadway grade crossings.




CHSR Corridor at the Portland Rose Quarter Transportation Hub




CHSR Corridor between Rose Quarter and Vancouver, WA, and other Possible Corridors

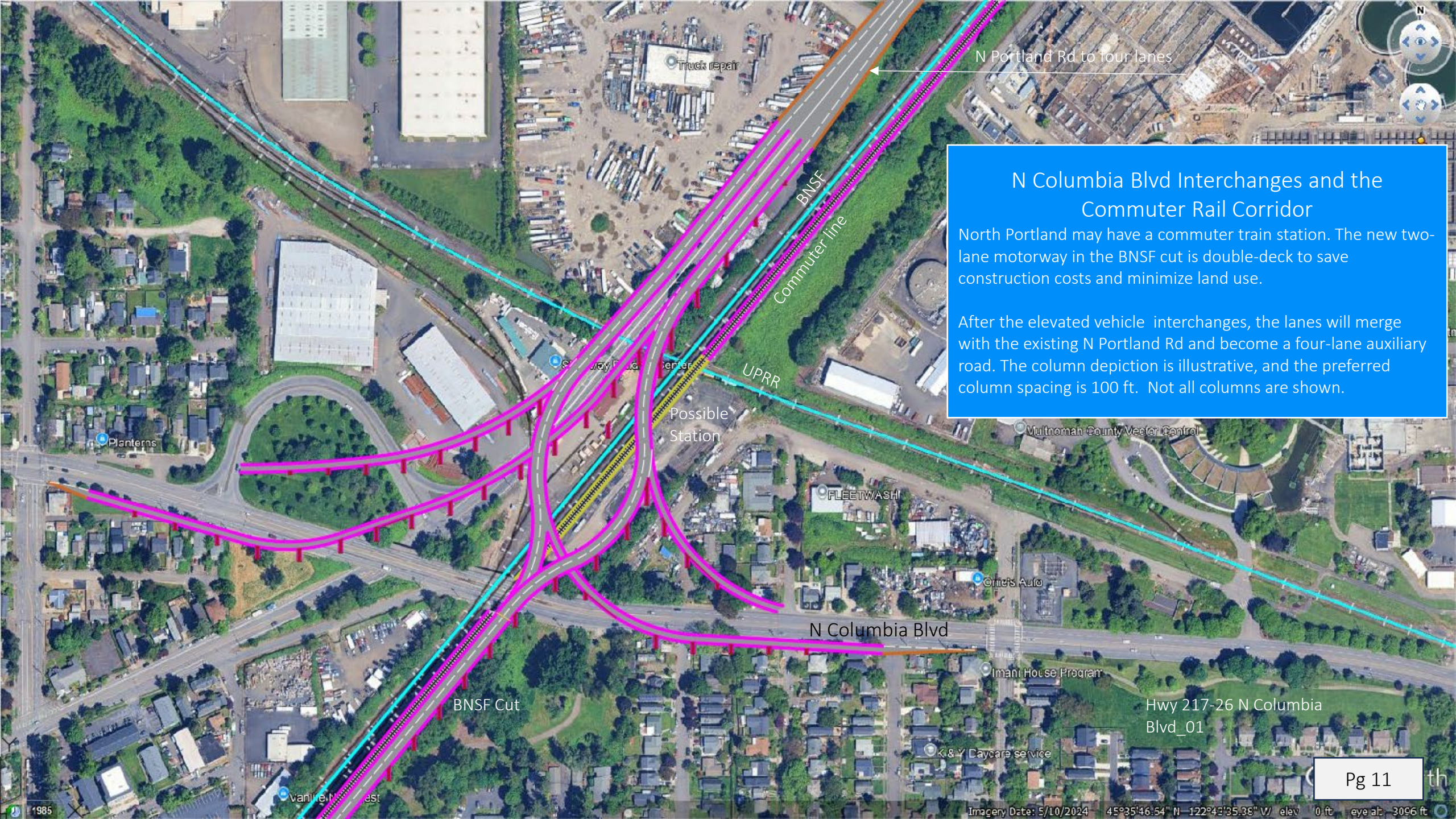



Proposed Cascadia Multimodal Bridge, Hayden Island Bridge, I-5 Bridge, and BNSF Railroad Bridge

The possible CCE Waterfront Station is on the west side of the existing BNSF tracks. The Amtrak Station is on the east side. A pedestrian bridge over the BNSF tracks will provide a connection to the Vancouver Waterfront.


# Proposed Hayden Island Auxiliary Bridge

The MAX corridor will be between the north and south traffic lanes on the new bridge over the Columbia River Slough at the same elevation as I-5.




## N Columbia Blvd Interchanges and the Commuter Rail Corridor

North Portland may have a commuter train station. The new two-lane motorway in the BNSF cut is double-deck to save construction costs and minimize land use.

After the elevated vehicle interchanges, the lanes will merge with the existing N Portland Rd and become a four-lane auxiliary road. The column depiction is illustrative, and the preferred column spacing is 100 ft. Not all columns are shown.


CHSR Multi-Modal Bridge, Revised version

The CHSR is above the BNSF/UPRR tracks.

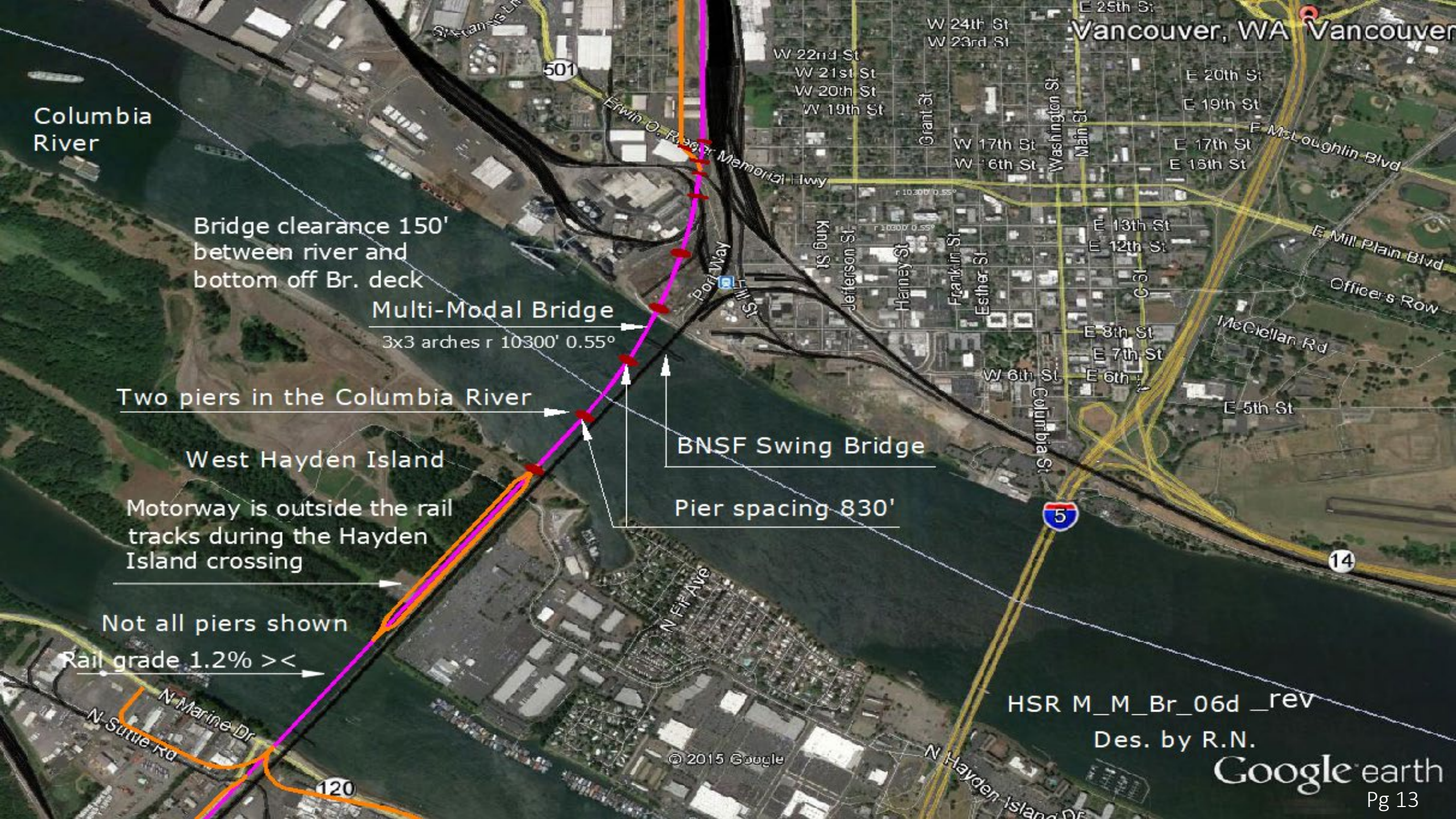
The roadways go below the CHSR tracks to Hayden Island, where they will go above.

The N Portland Rd has single-lane on- and off-ramps.

N Marine Dr from the I-5 interchange has a single on-ramp to Vancouver.

The Vancouver-to-N Marine Dr has a single off-ramp.

This layout will reduce traffic on the I-5 bridge by 30%.


Columbia River
Bridge clearance 150' between river and bottom off Br. deck
Multi-Modal Bridge
3x3 arches r 10300' 0.55°
Two piers in the Columbia River
West Hayden Island
Motorway is outside the rail tracks during the Hayden Island crossing
Not all piers shown
Rail grade 1.2% ><
BNSF Swing Bridge
Pier spacing 830'
HSR M_M_Br_06d _rev
Des. by R.N.
Vancouver, WA
Vancouver
Erwin O. Rieger Memorial Hwy
Port Way
N Fir Ave
N Marine Dr
N Suttle Rd
N Hayden Island Dr
Columbia St
Washington St
Main St
Grant St
Jefferson St
Harney St
Franklin St
Esther St
King St
McClellan Rd
Officers Row
E Mill Plain Blvd
E McLoughlin Blvd
W 24th St
W 23rd St
W 22nd St
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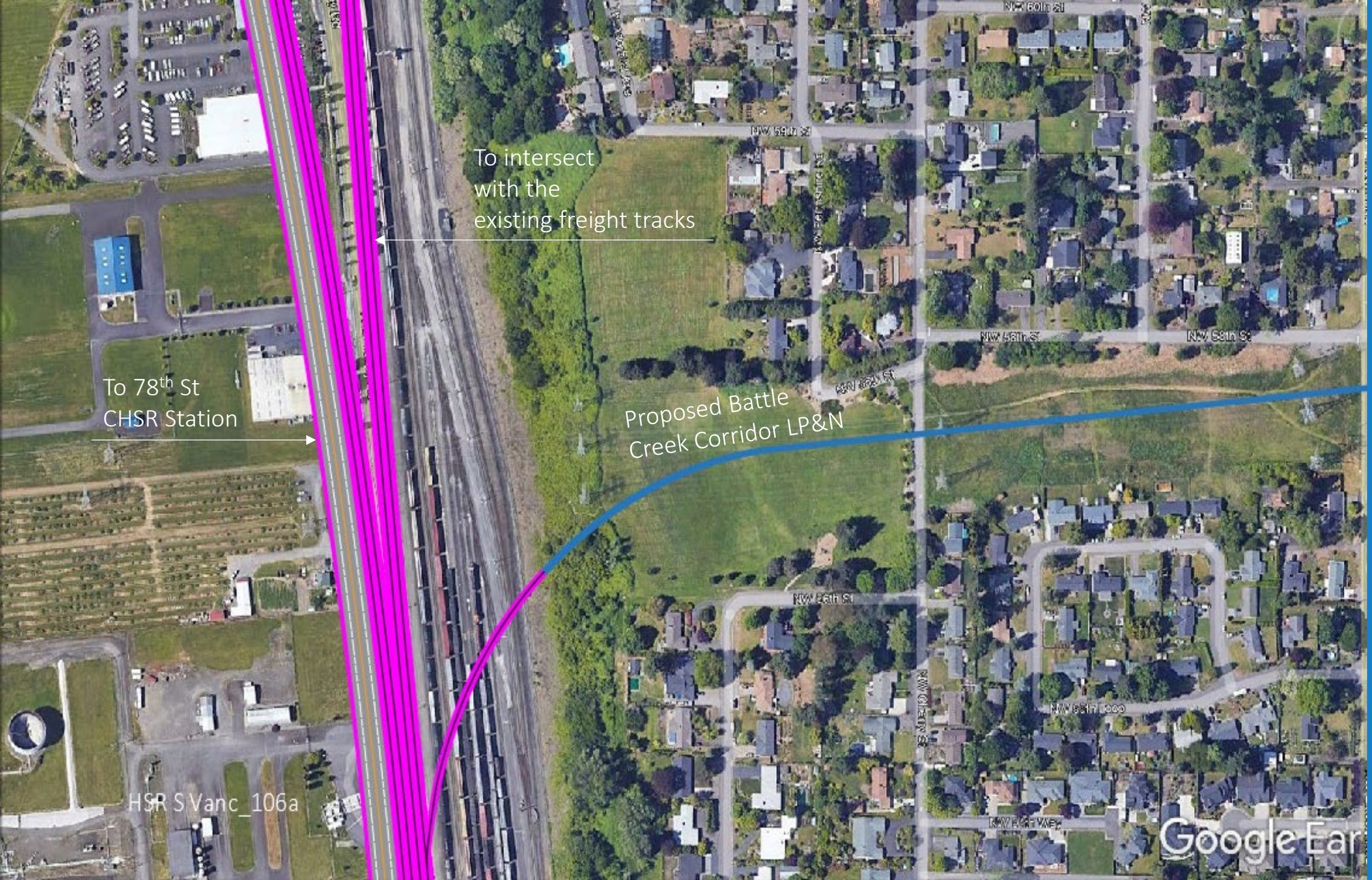
W 6th St
E 6th St
E 5th St
501
5
14
120
© 2015 Google
Google earth


# The Cascadia Multimodal Bridge Corridor Connections to Mill Plain Blvd in Vancouver, Washington

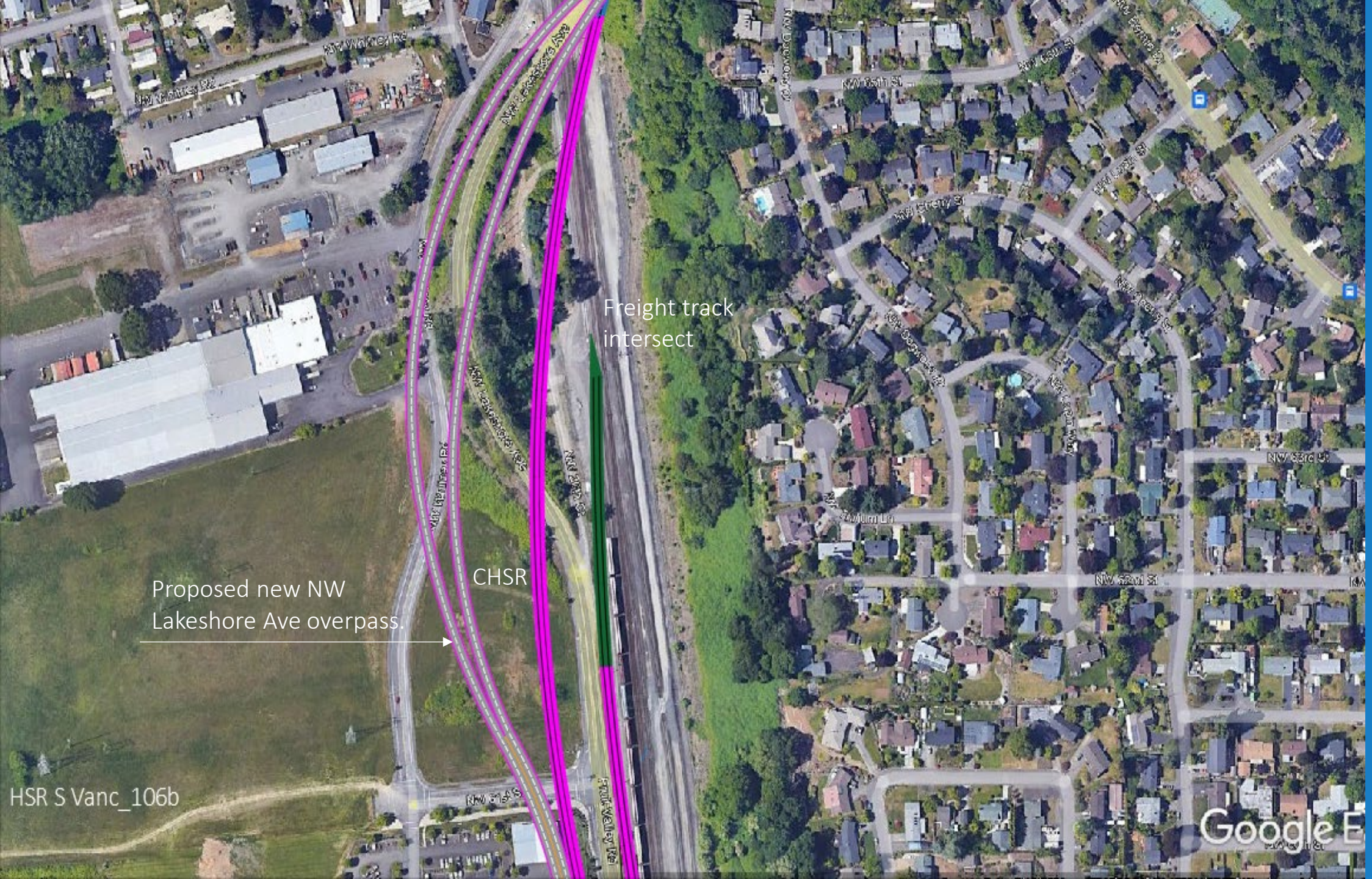
All three corridors are elevated above the existing freight rail yard and will not interfere with on-ground freight movements.




CHSR Corridor 1.6 Miles North of 4th Plain Blvd

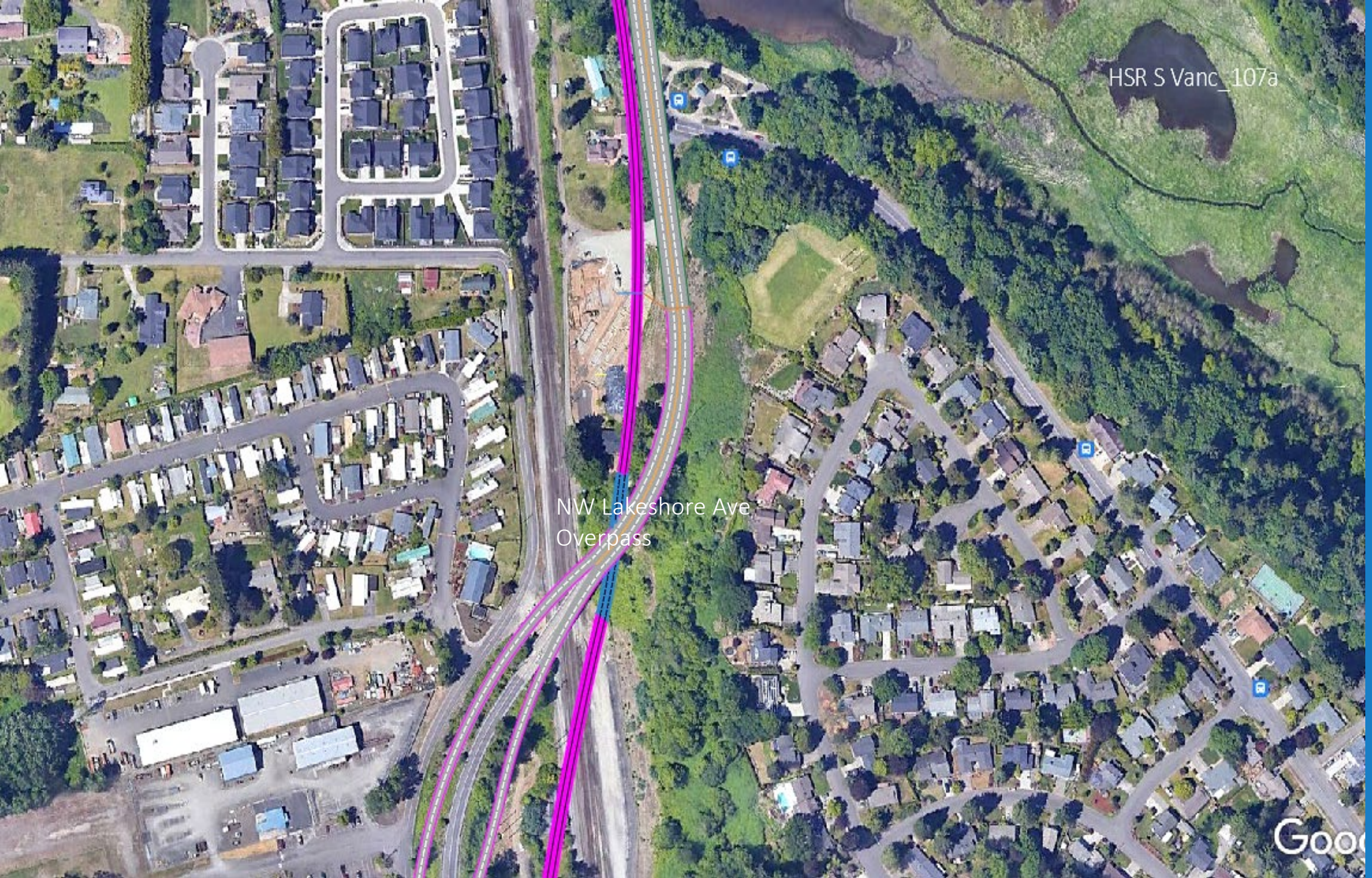
At this point, the CHSR corridor will split. The freight line will reconnect with the existing freight tracks, and the CHSR will continue north.

The Battle Creek Corridor is a proposed line to serve commuters in northwest Vancouver.




## Freight Track Interchange and CHSR Corridor Flyover South of NW 78th Street

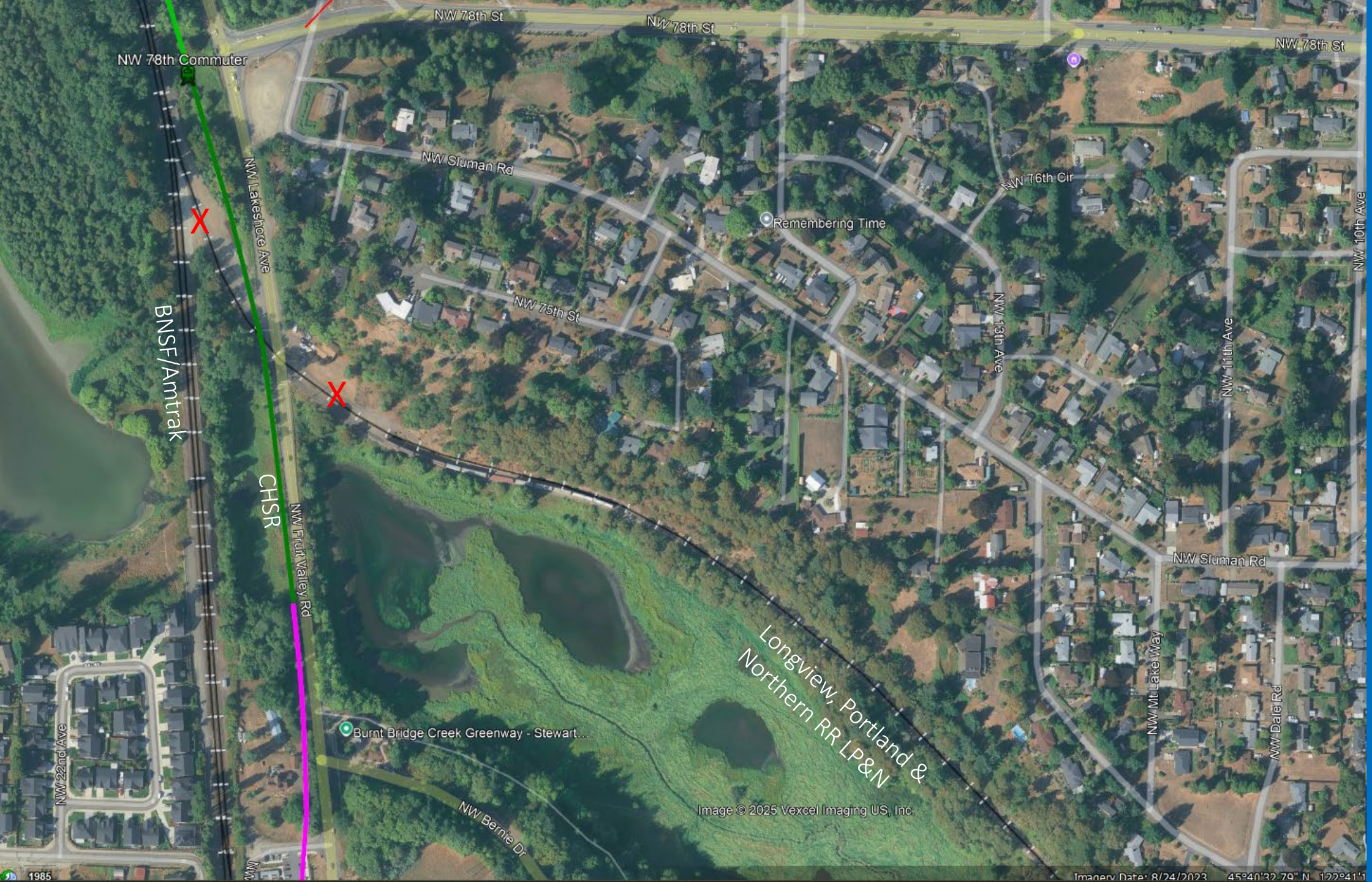
The proposed freight tracks over the CHSR Multi-Modal Bridge intersect at this point with the existing on-ground freight tracks.




# CHSR Corridor at the Proposed NW Lakeshore Ave Overpass

The new NW Lakeshore Ave overpass will become a four-lane corridor.

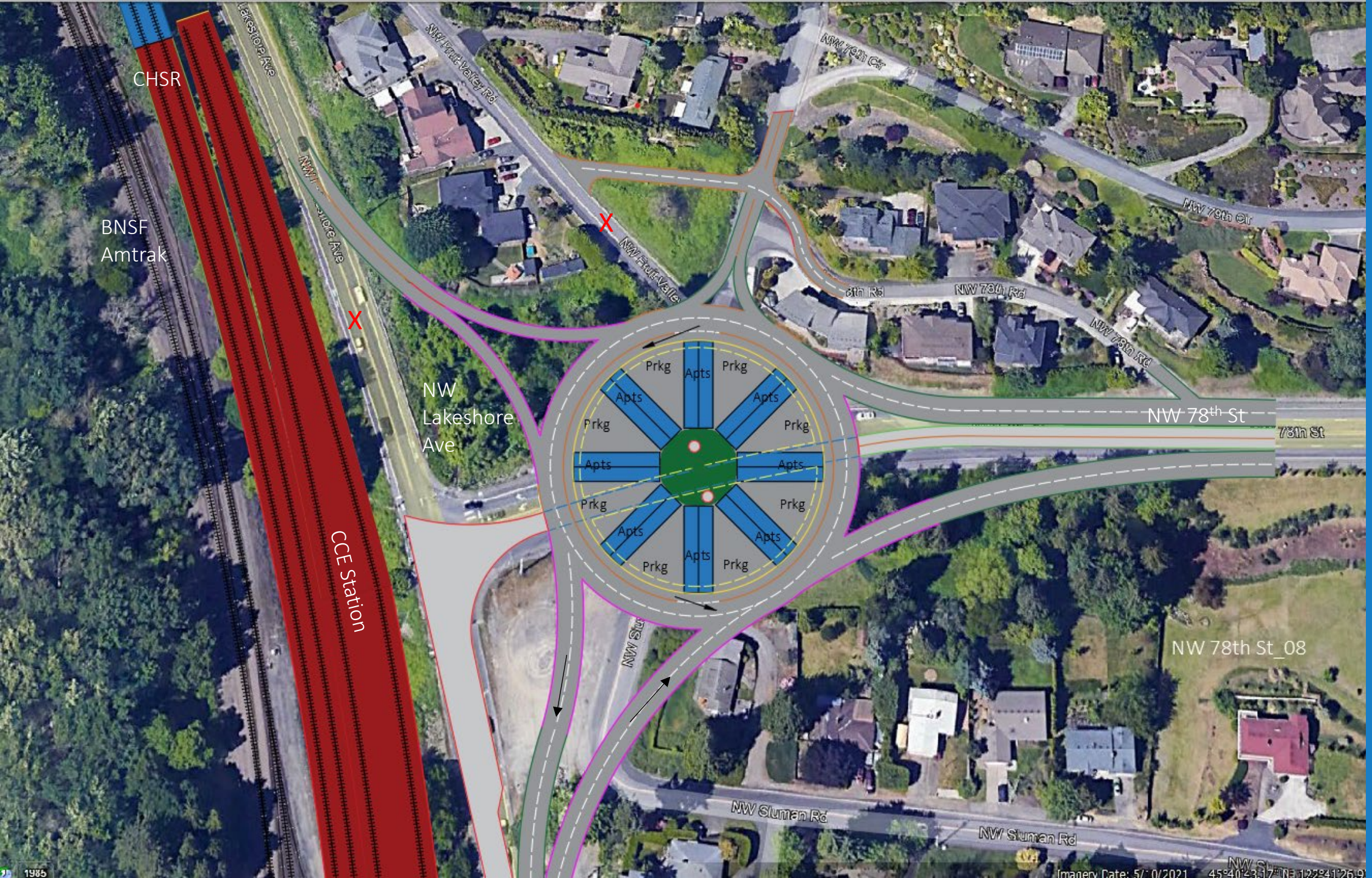
The CHSR is in a short tunnel below the new NW Lakeshore Ave bridge.




## CHSR South of NW 78th St CCE Station

The existing LP&N freight RR corridor will be closed X and rerouted 1.26 miles to the south, just north of NW 56th St, and in a tunnel below the HV power lines.

The existing LP&N RR corridor can then be developed for housing.

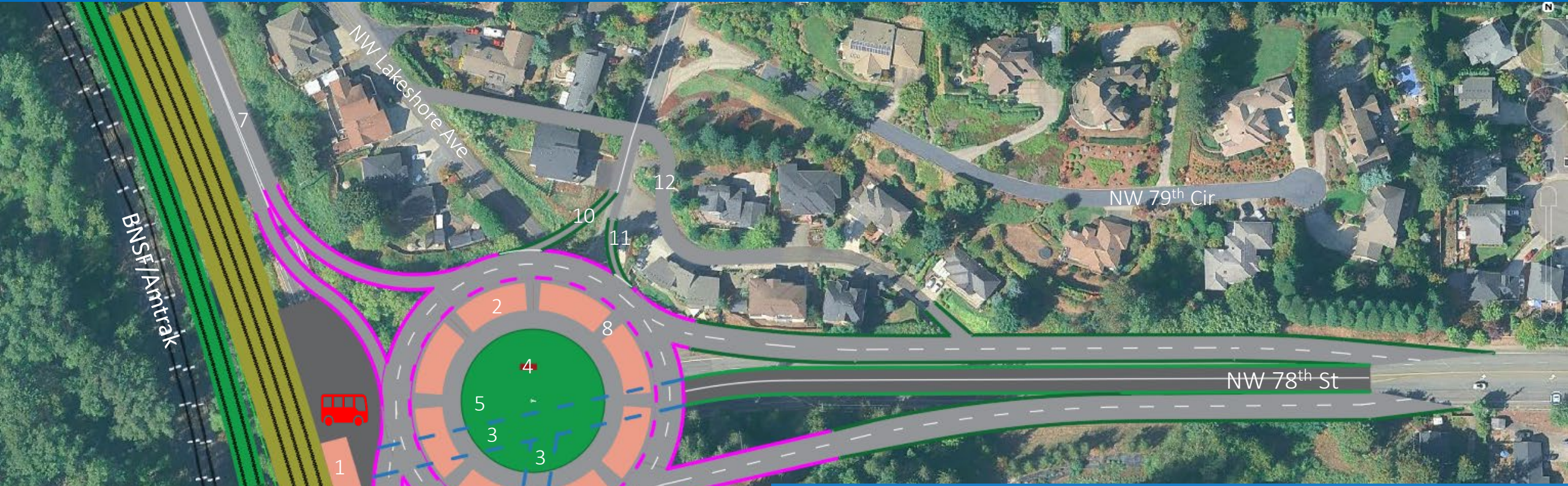



CHSR Corridor with CCE Station at NW 78th St and Possible Town Center/TOD Plan

There are train storage and service tracks north of the CCE station.

CHSR C-ICE trains do not stop here.

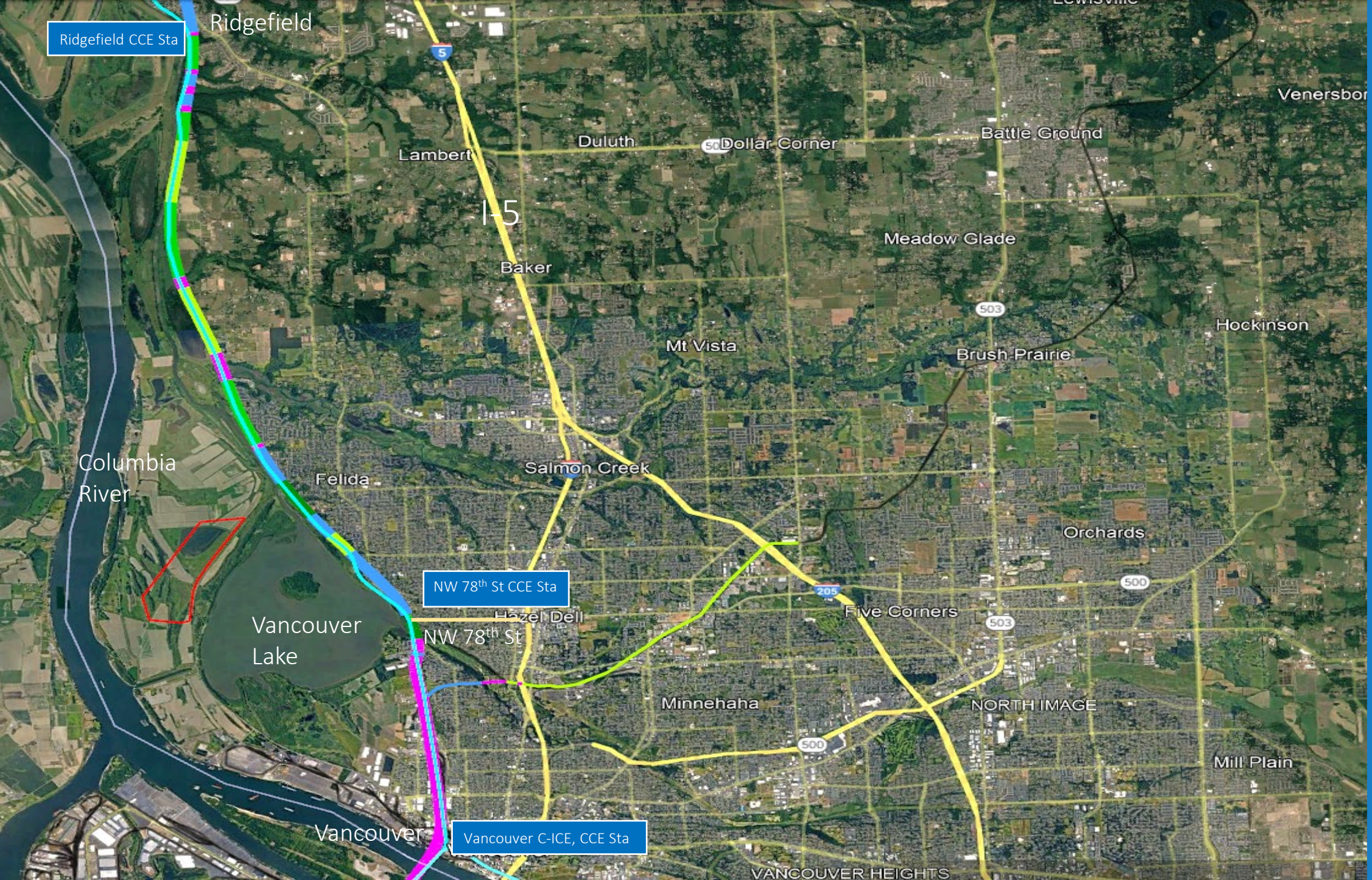
CCE station pedestrian access to the roundabout is at ground level.
X = closed.




## NW 78th St CHSR Station with Proposed Roundabout

The traffic flow is counterclockwise. The NW 78th St, to and from the roundabout, has two lanes. The NW Lakeshore Ave on- and off-ramps have one lane. The NW Sluman ramp road (#6) has one lane of traffic. The CCE station has a bus stop, and additional parking is under the elevated roundabout. The CCE tracks are for light maintenance and train storage. The ramp grades are less than 6%. The CHSR trains do not stop at the CCE station.

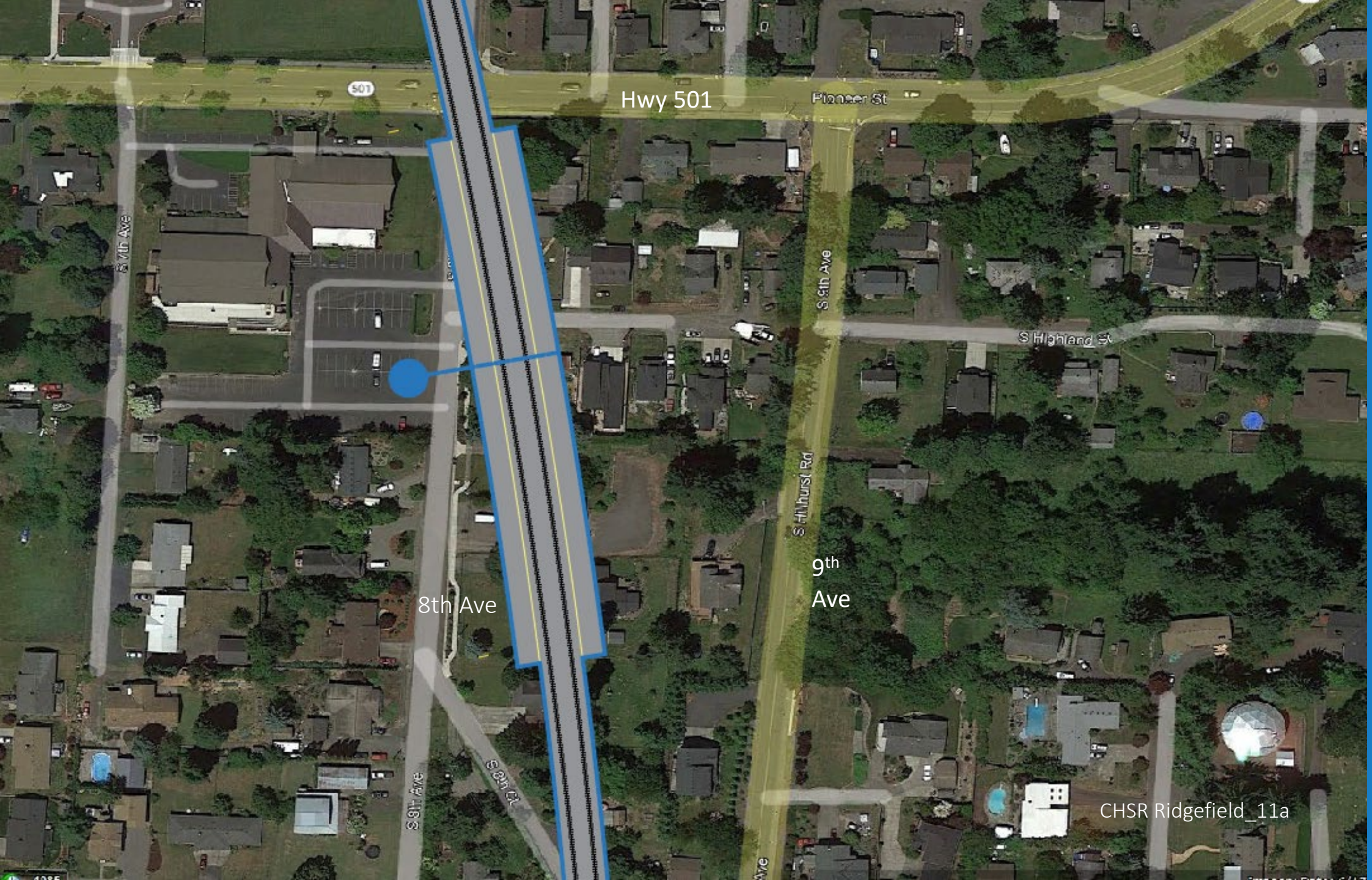
1 = CCE Station. 2 = three stories housing. 3 = tunnels. 4 = elevators and stairs to the parking area below. 5 = greenery and shrubs. 6 = NW Sluman ramp. 7 = NW Lakeshore Avenue. 8 = residential access from the roundabout. 9 = Lakeshore Ave, south side has four lanes. 10 = NW Bacon Rd on ramp. 11 = Bacon Rd off ramp. 12 = New 78th Rd connection. X = closed.




CHSR between NW 78th St in Vancouver and Ridgefield

Several miles are along a hillside with a 9% slope.

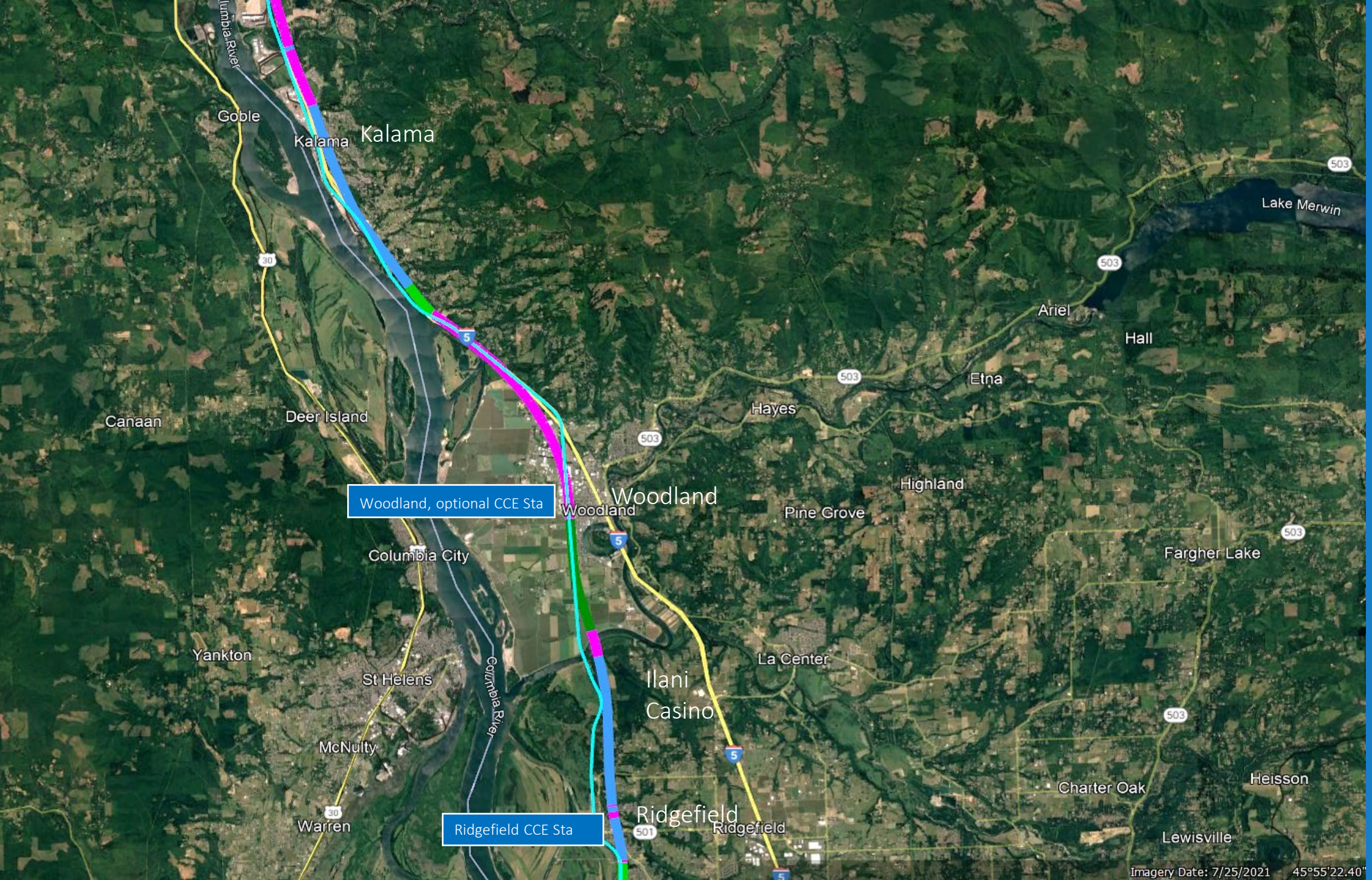
See Stabilization Plan Addendum.




CHSR Ridgefield CCE Underground Station

The overall station width is 76 ft, and the length is 750 feet.

Commuter trains are shorter than C-ICE trains.




CHSR Corridor between Ridgefield and North Kalama


## CHSR Longview Yard

This is a new 9-acre CHSR light-duty yard.

This yard will provide the most-needed train maintenance and can store CHSR trains.

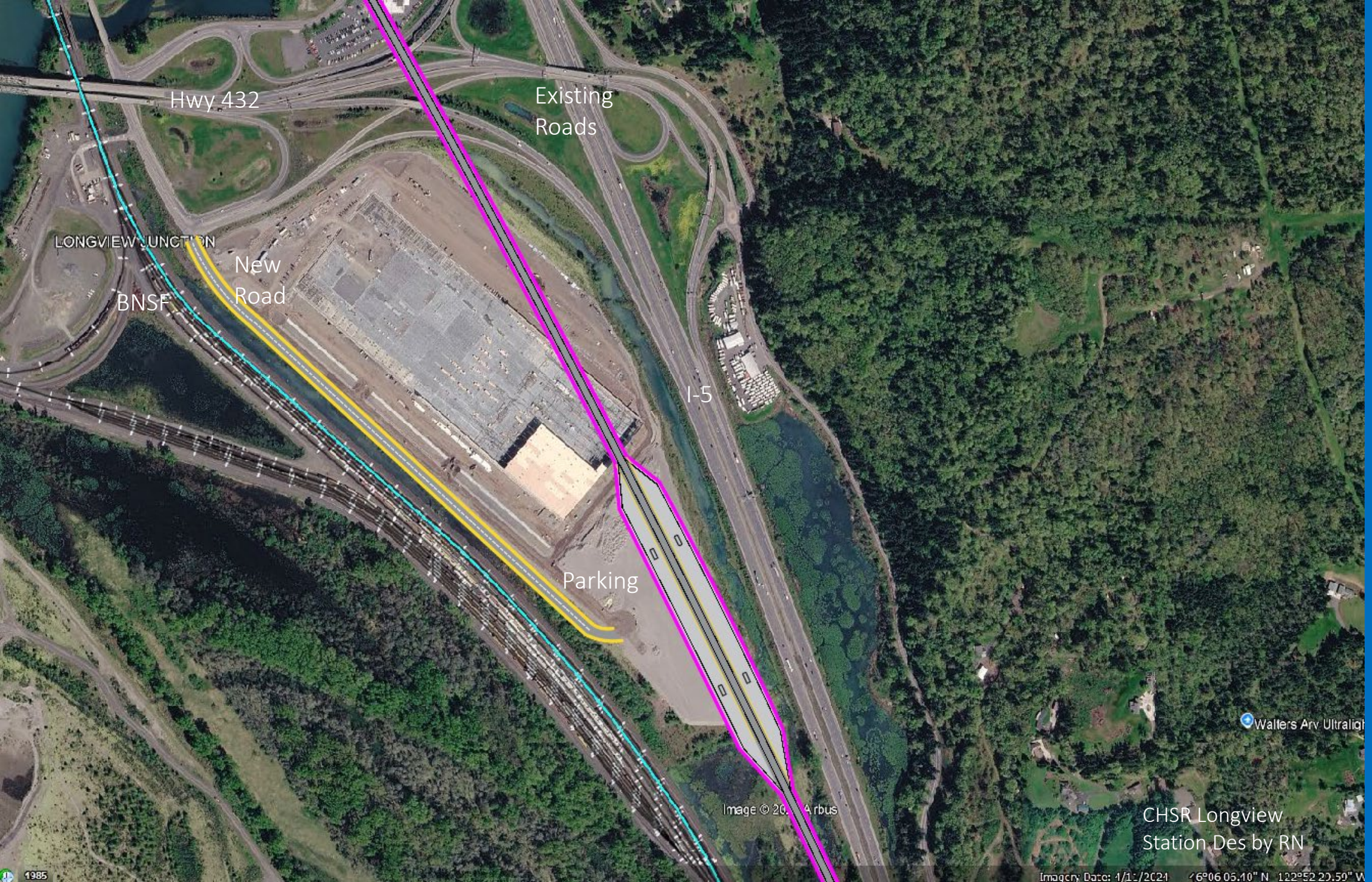
Express freight transit exchange can be done at this yard. This yard has no interchange with freight railroads.

A new access road will be required.


## CHSR Corridor Original CHSR Station Location

The original station plan can no longer be used due to insufficient consideration of the previously proposed corridor planning.

This is why long-term HSR planning is crucial for achieving the preferred results.




# Longview CHSR Station

This is the new station location for the CHSR.

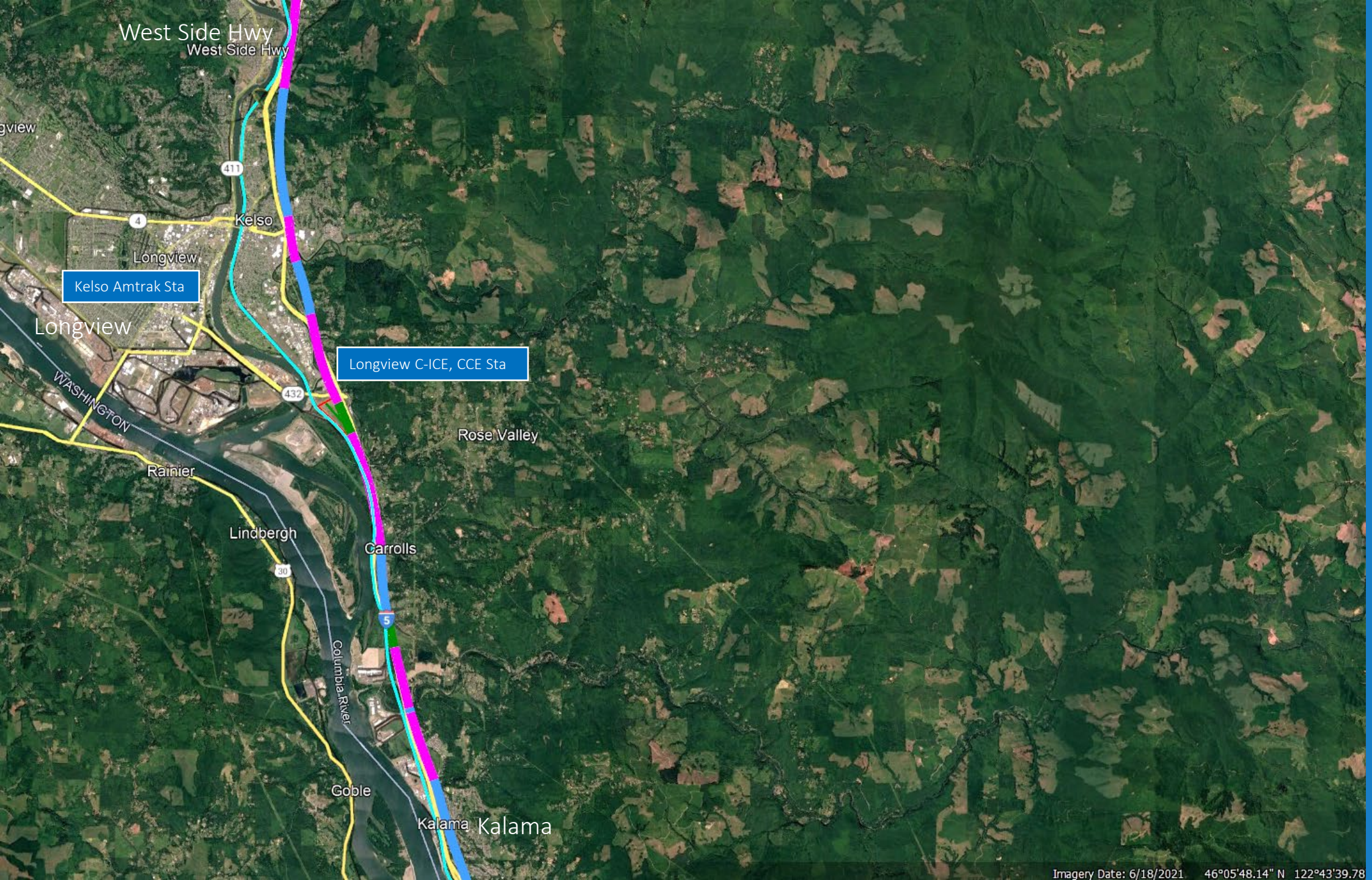
Parking area = 15 acres.

The platform is 40 feet above ground. The station tracks are 1300 feet long.

This station has four tracks at the platform. There are two 20-foot-wide platforms between the tracks.

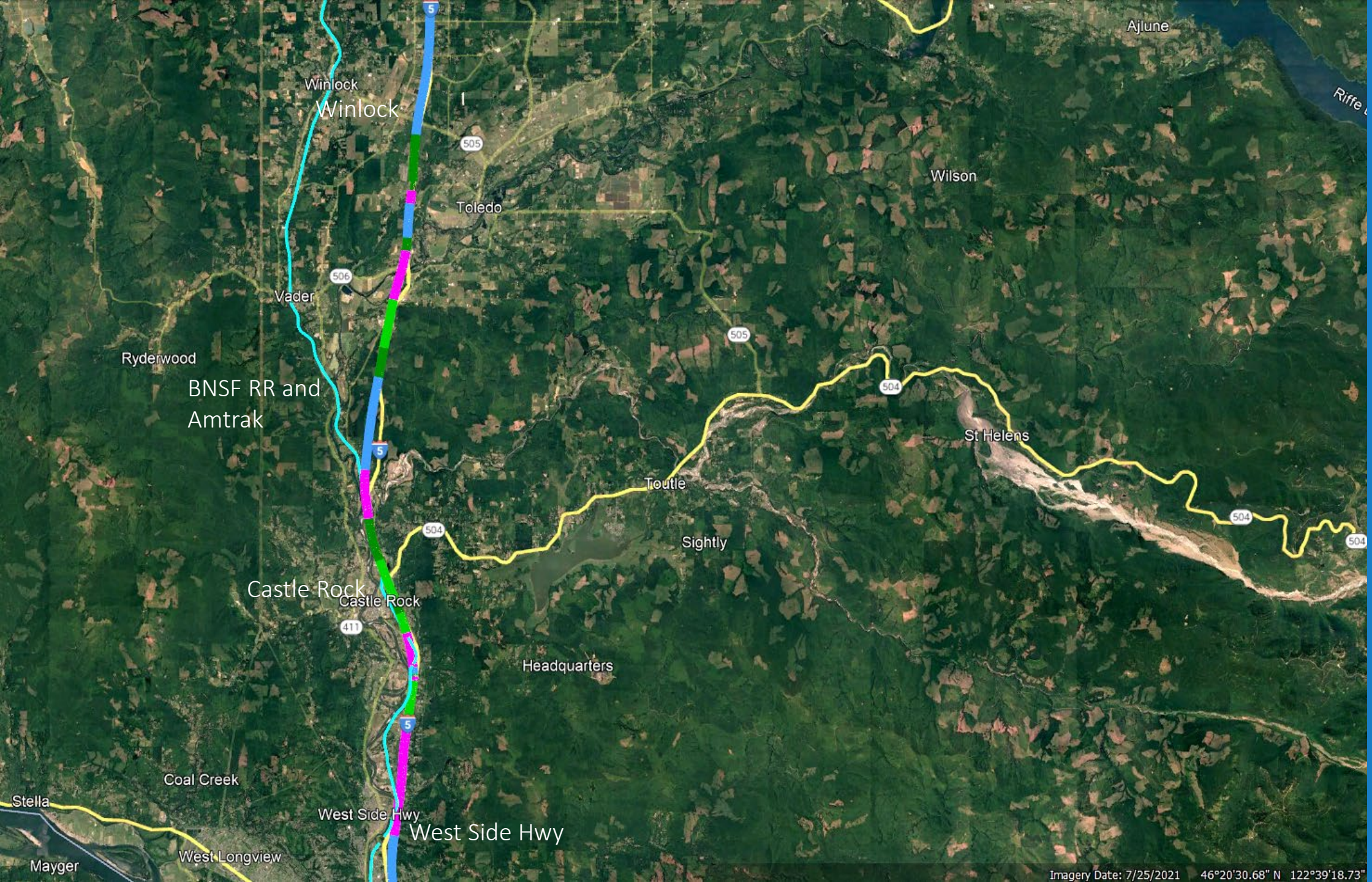
Access is available via elevators, escalators, and stairs.

CHSR Longview Station Des by RN

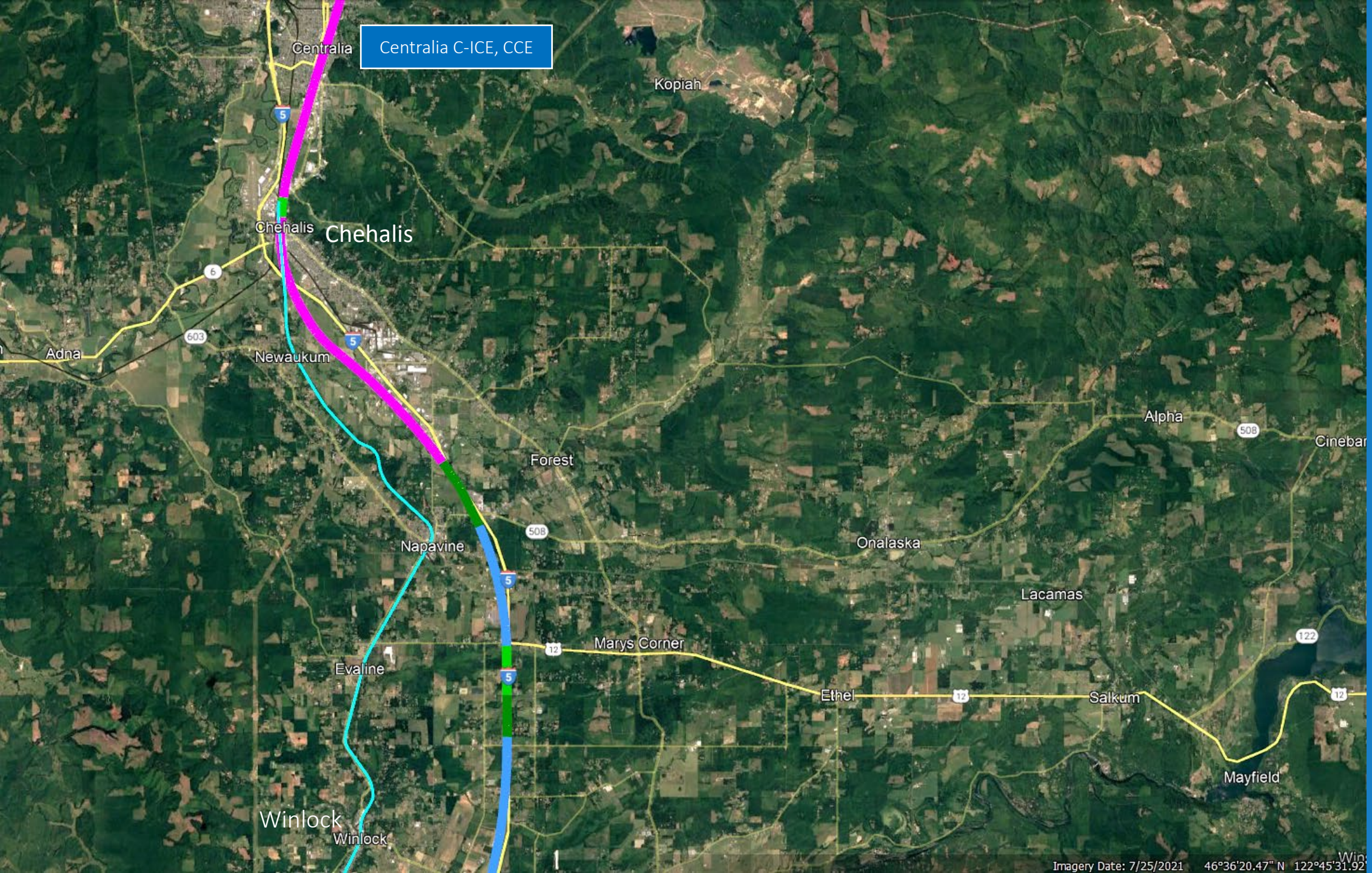



CHSR Corridor between Kalama and Longview CHSR Station

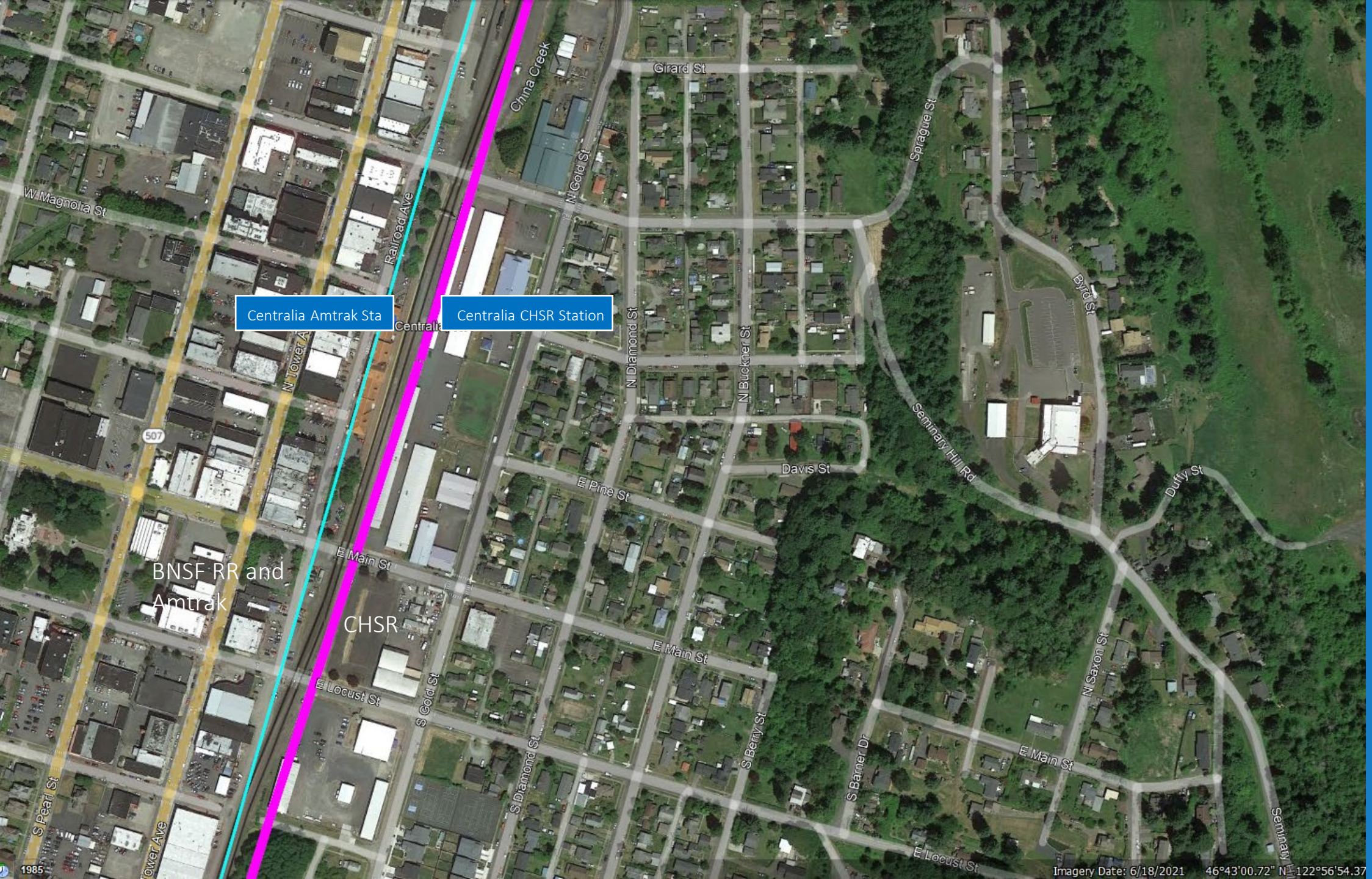
This corridor section has flyovers, fills, tunnels, and a full-service CHSR yard.



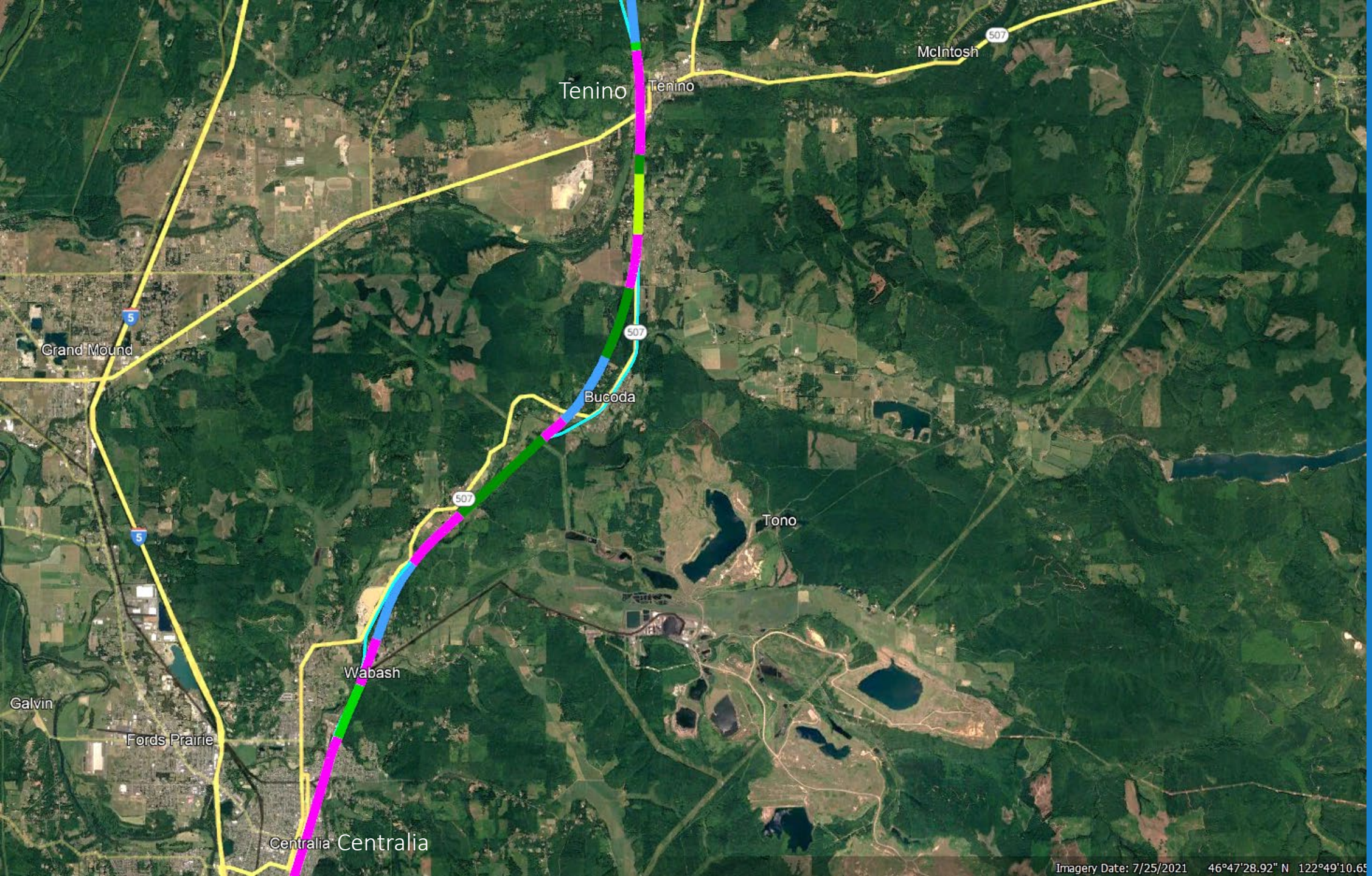

CHSR Corridor between West Side Hwy and East of Winlock



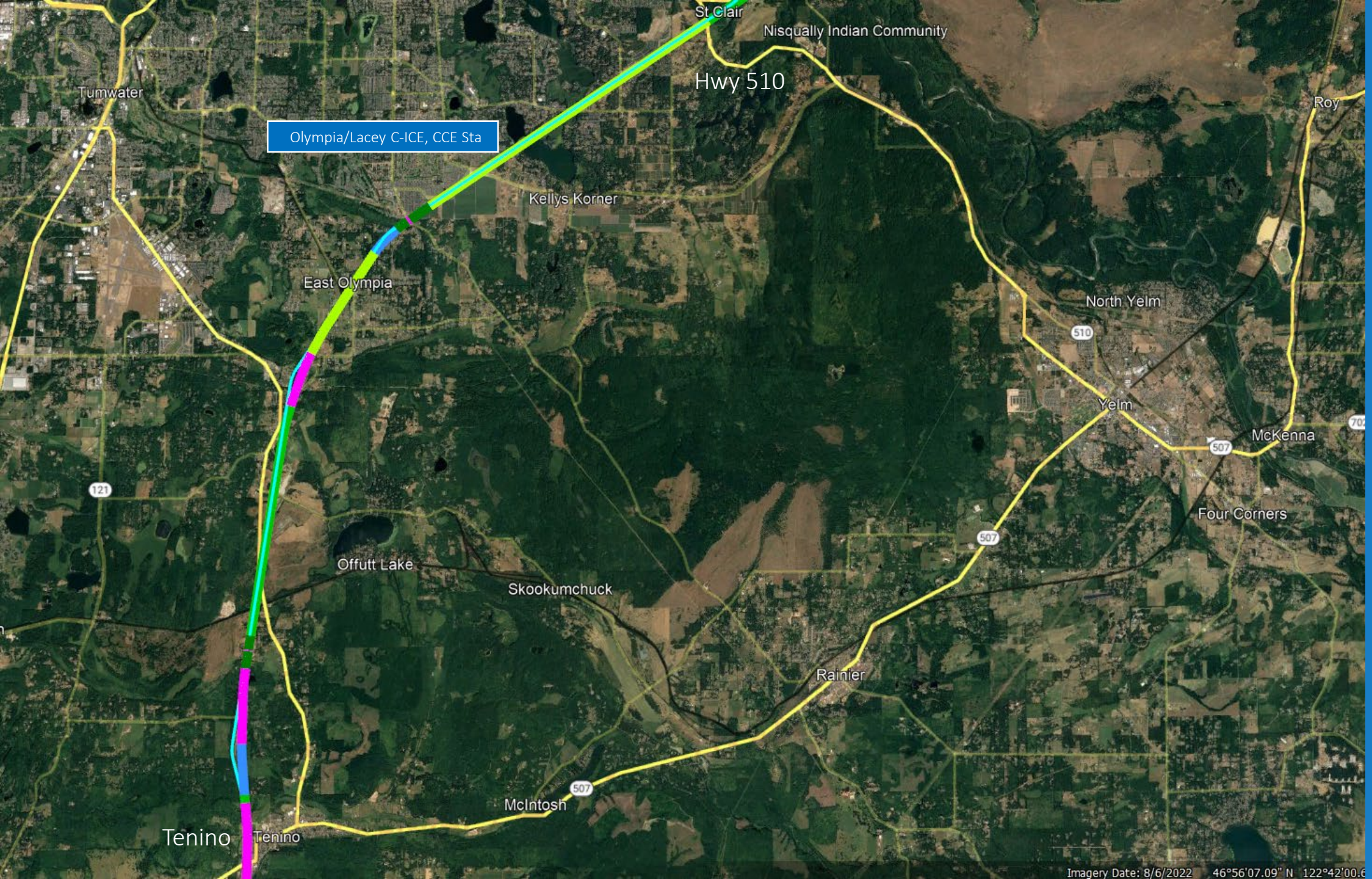

CHSR Corridor between East of Winlock and Centralia




Cascadia High Speed Rail and Amtrak Station in Centralia




CHSR Corridor between Centralia and Tenino

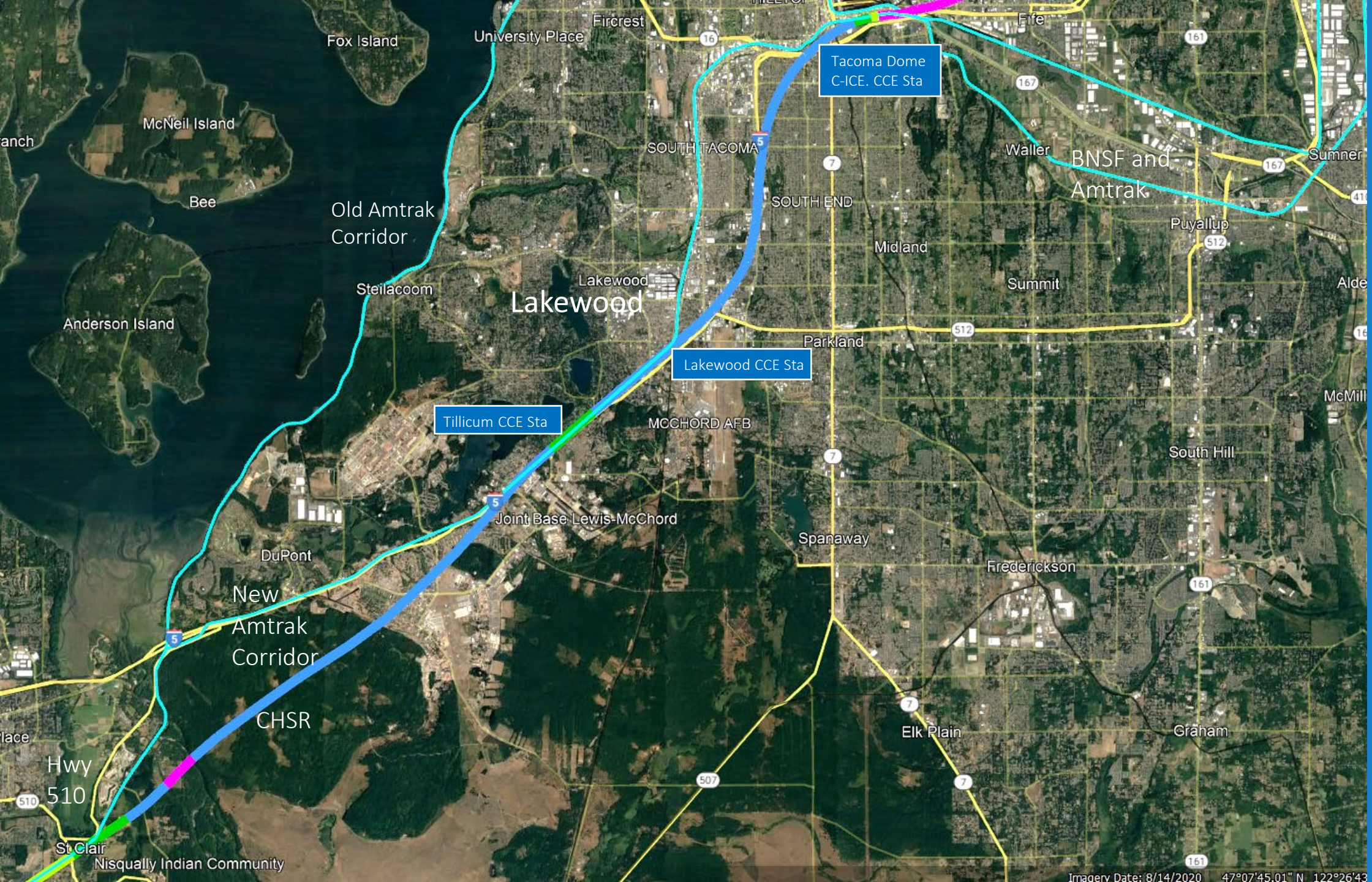



CHSR Corridor between Tenino and Hwy 510


## Lacey/Olympia Proposed CHSR and Existing Amtrak Stations

The CHSR corridor is in a widened cut under Yelm Hwy SE and at the same level as BNSF/Amtrak tracks.

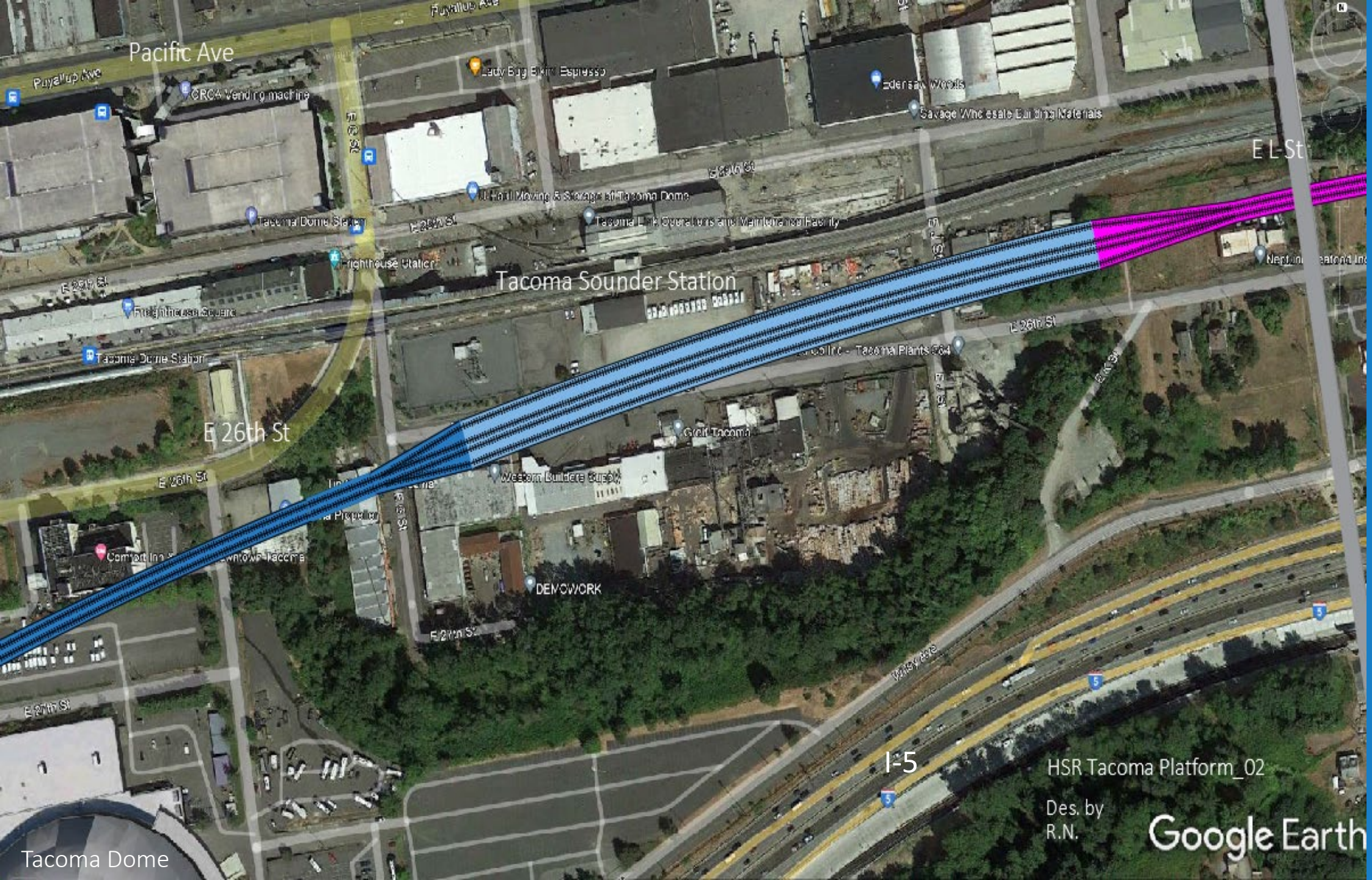
Farmland to the east is a good location to rezone for a new town center.




CHSR Corridor between Hwy 510 and Tacoma

The existing BNSF freight rail corridor has many tight curves that are unsuitable for CHSR trains.

The Tillicum station is in the cut-and-cover. The Lakewood and Tacoma stations are in the underground tunnels.

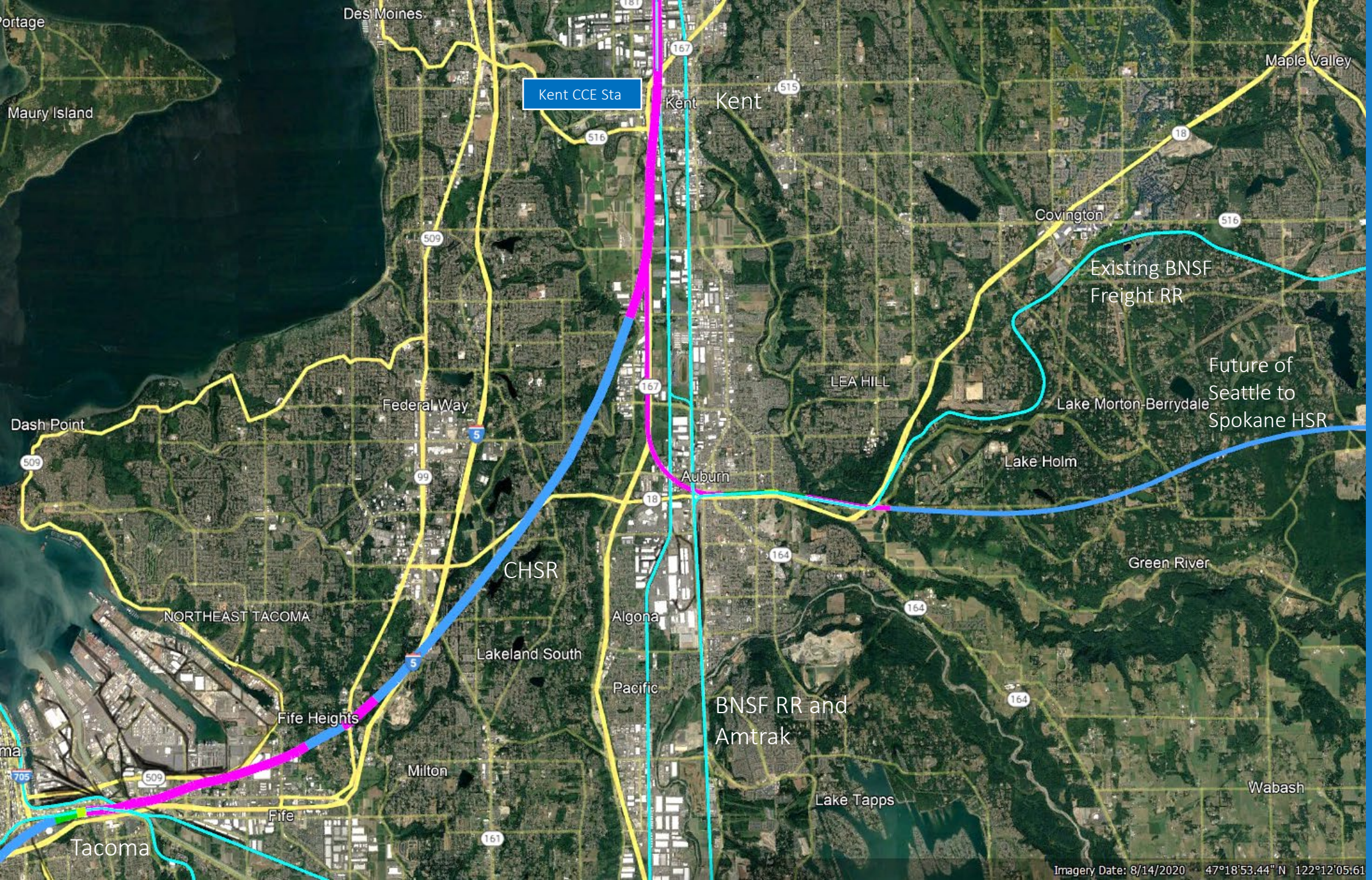



## CHSR at the Tacoma Dome Station

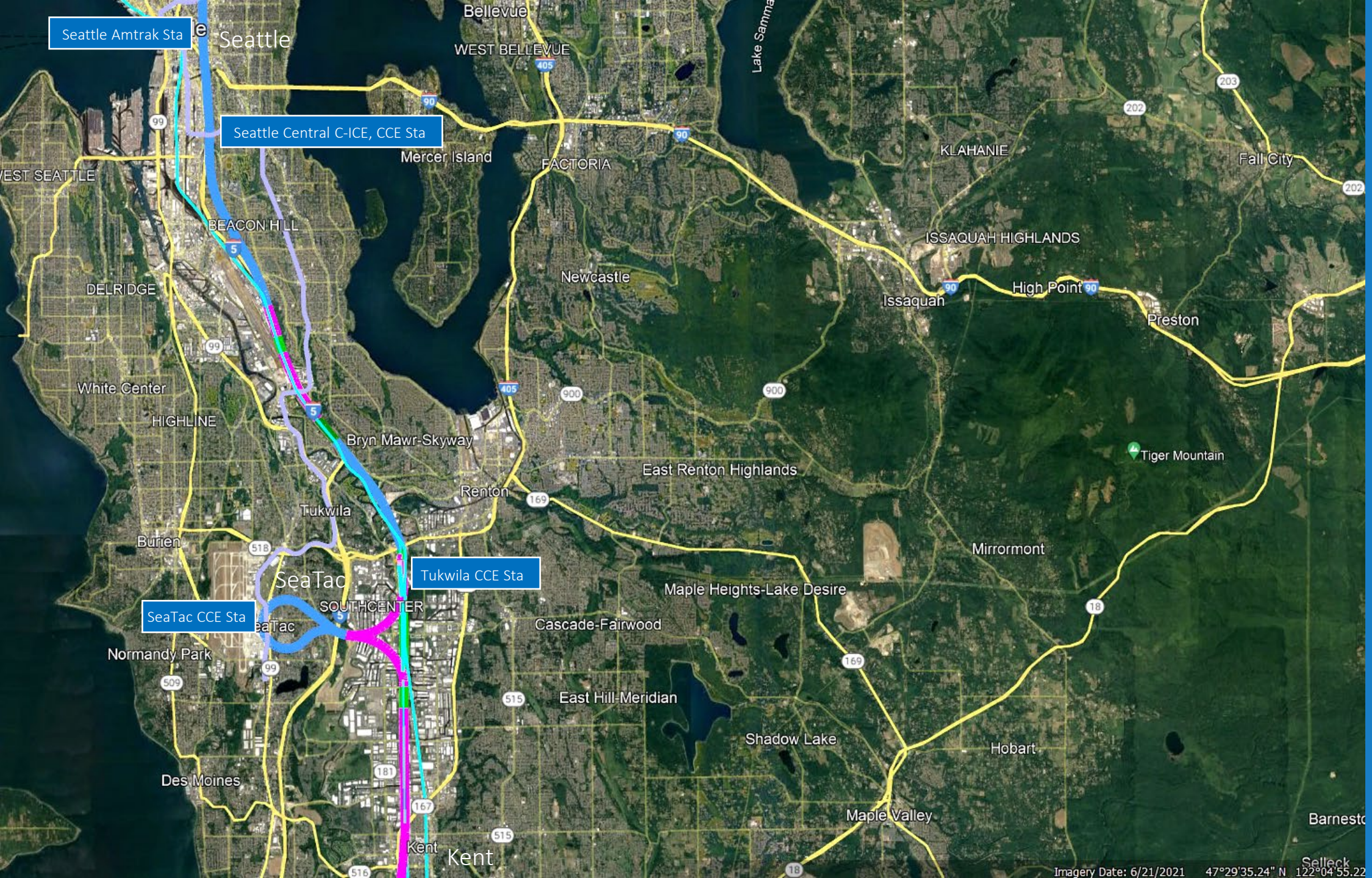
The CHSR C-ICE CCE corridor is part tunnel and part cut-and-cover.

The station is below the city streets to the west and a flyover to the east. The CHSR will underpass E L Street.

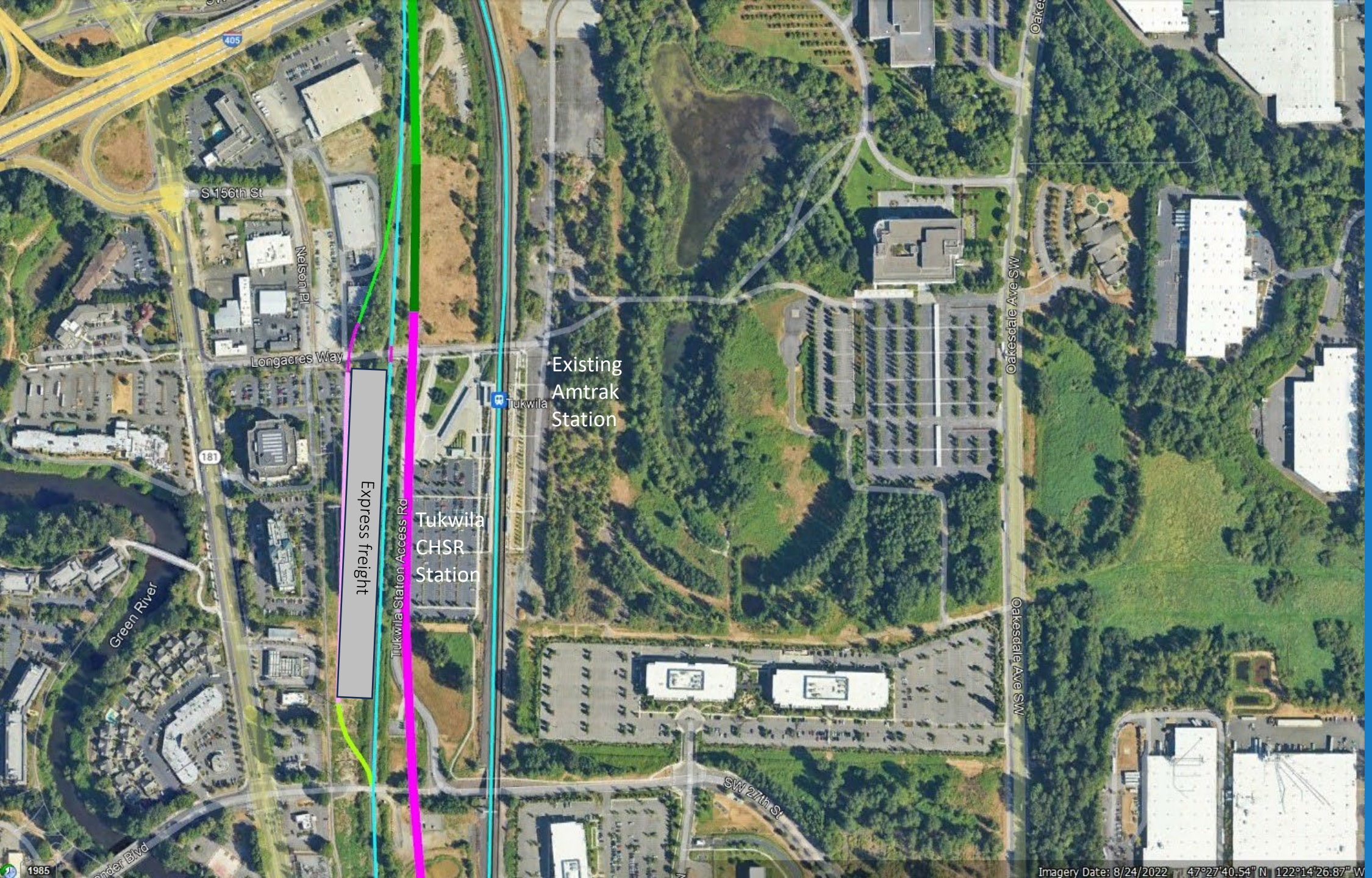
The land surrounding the new C-ICE CCE Station is well-suited for a town center. (see next page)




CHSR Corridor between Tacoma and Kent



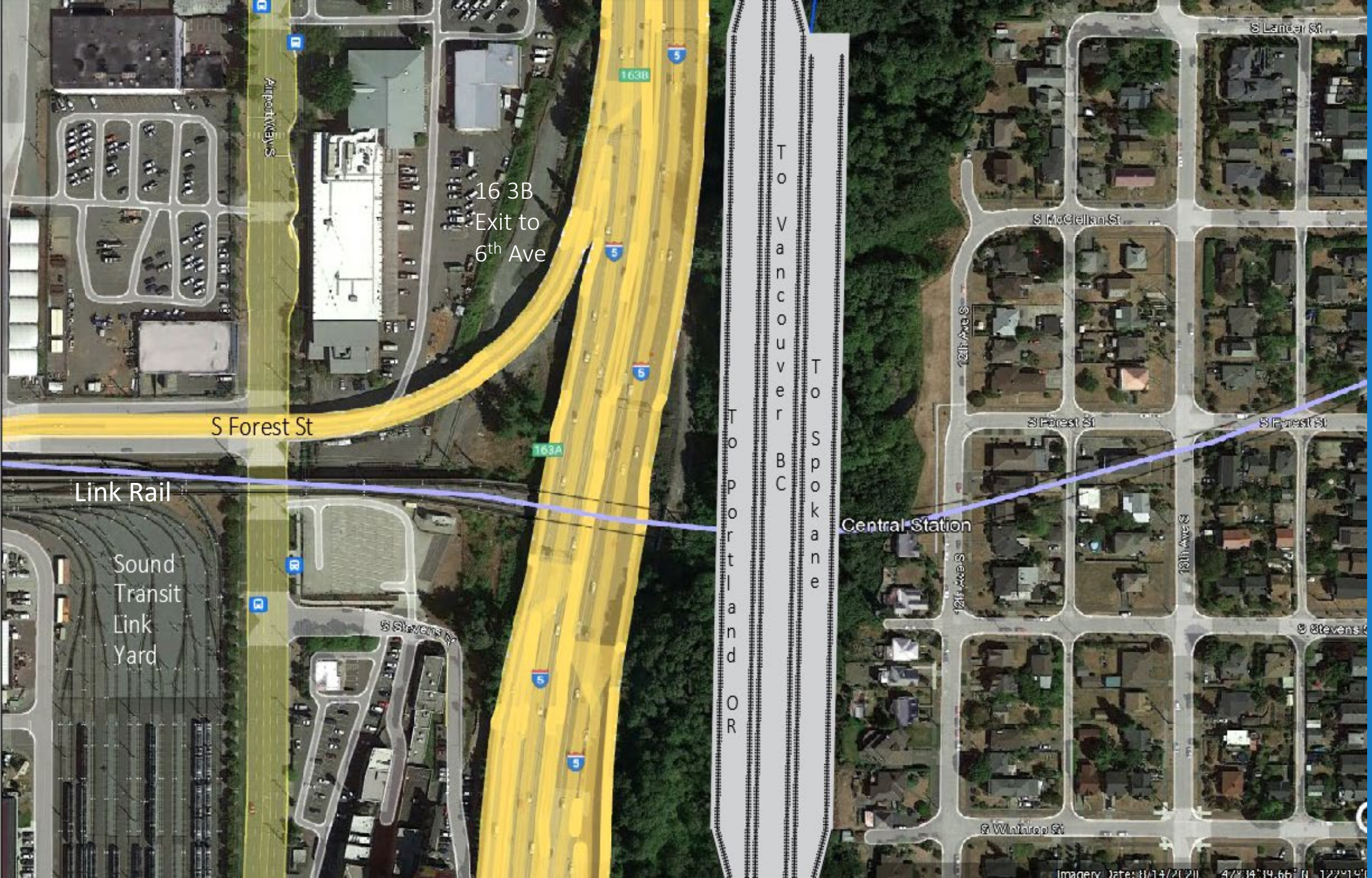

CHSR between Kent and Seattle




## HSR at Tukwila

Here we have express freight. Station to load/unload containers.

Not all trains will stop at Tukwila.




## CHSR at the new Seattle Central Station

This station is below ground and above the Link-Rail Line.

The station has six tracks: two to Vancouver, BC, two to Portland, and two for a future Spokane connection.

Mixed-use development and parking are above the new underground Link Rail Station and CHSR Station.


I-5
8TH AVENUE
TH AVENUE
RAIL TRANS
CHSR TO LIGH
RAIL TRANSFER
CHSR STAT
STATION ENTRANCE
STATION SQUARE
VARIETY OF HOUSING OPTIONS
LIGHT RAIL
4TH AVENUE
SOUTH LANDER STREET
SOUTH FOREST STREET
LIGHT RAIL TRANSIT YARD
S Stacy St
4th Ave S
3rd Ave
Airport Way S
LOPMENT BOUNDARY
15,300,000 SF
(2:1 FAR)= 10,200,000 SF
1:1) = 5.1 mil. SF

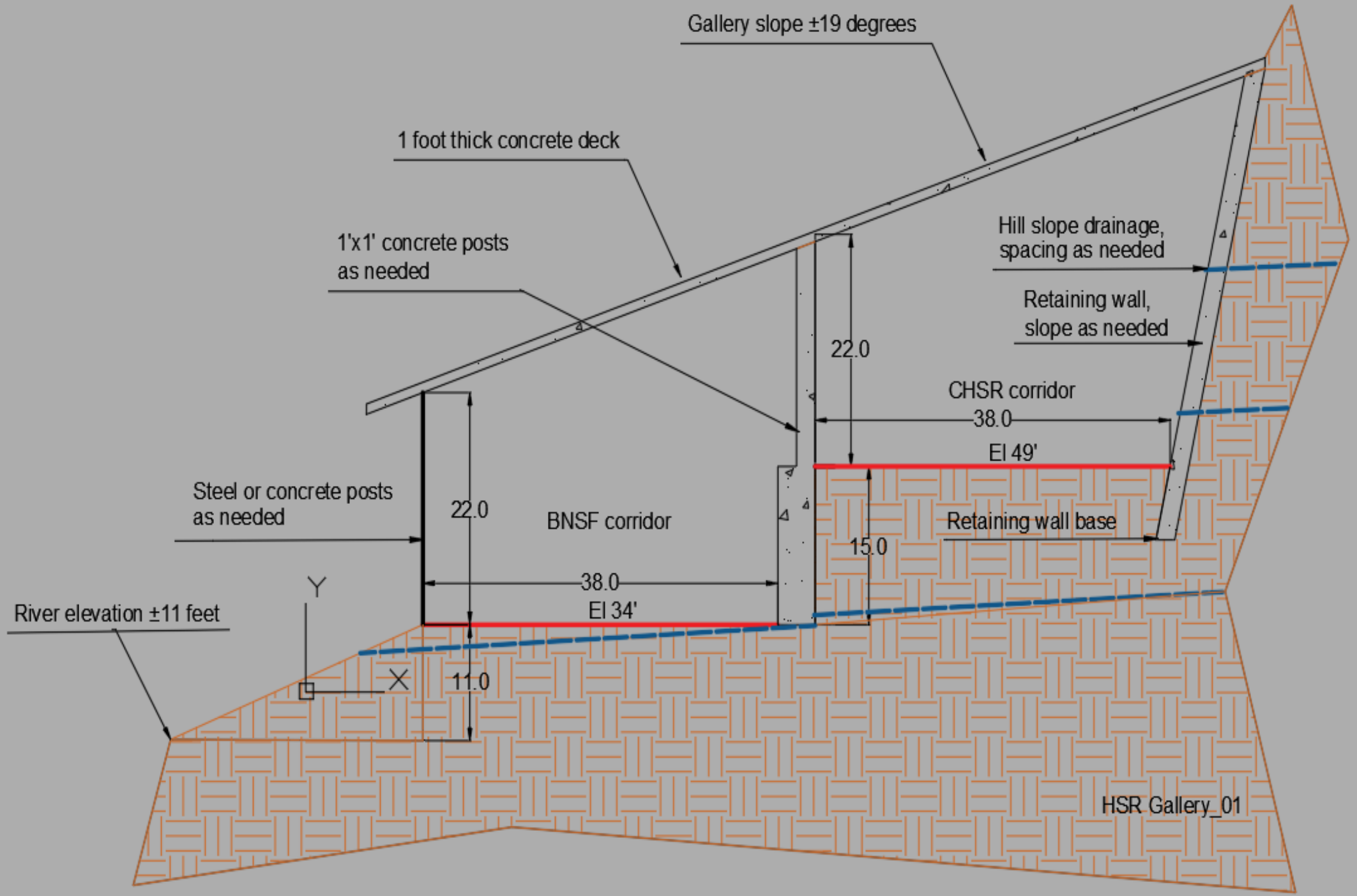
# Portland CHSR Station to Olympia/Lacey CHSR Station Mileage and Times

Number One = Priority, Number two = Secondary Stops

| Station to Station | CHR Corridor Milage | Estimated Travel Times |
|---|---|---|
| Portland-Vancouver, OR # 1 | 7.38 miles | 7 minutes |
| Vancouver-NW 78th St # 2 | 3.98 miles | 5 minutes |
| 78th – Ridgefield # 2 | 10.28 miles | 8 minutes |
| Ridgefield-Woodland # 2 | 5.84 miles | 6 minutes |
| Woodland-Long View # 2 | 15.66 miles | 10 minutes |
| Portland-Long view Direct # 1 | 43.14 miles | 19 minutes |
| Long View-Centralia # 1 | 44.61 miles | 18 minutes |
| Centralia-Olympia/Lacey # 1 | 24.26 miles | 12 minutes |
| Via C-ICE with three stops | Portland-Olympia/Lacey | 49 minutes |
| Via C-ICE with one-stop | Portland-Tacoma-Seattle Central | 58 minutes |

# Olympia/Lacey CHSR Station to Seattle Central CHSR Station Mileage and Times

| Station to Station | CHSR Corridor Milage | Estimated Travel Times |
|---|---|---|
| Olympia/Lacey-Tillicum | 15.22 Miles | 10 minutes |
| Tillicum-Lakewood | 2.66 Miles | 4 minutes |
| Lakewood-Tacoma Dome Sta | 7.60 Miles | 7 minutes |
| Tacoma Dome Sta-Kent | 13.85 Miles | 9 minutes |
| Kent-Tukwila | 5.81 Miles | 7 minutes |
| Tukwila-Seattle Central | 8.81 Miles | 7 minutes |
| **Transportation Mode Comparison** | **Stop to Stop** | **Estimated Travel Time** |
| Portland-Seattle King Station | 187 miles (Amtrak) | 3hr 45 minutes |
| Portland-Seattle | 173.7 miles (Automobile) | 2hr 56 minutes |
| Portland-Seattle Central Station | 167 miles (CHSR) | 58 minutes |
| | | |




Stabilization Plan, Ridgefield Section Plan, and Sounder Corridor between Seattle and Everett

The slope-drainage pipes prevent landslides.

Falling trees and debris will slide over the gallery roof without damaging the rail tracks.


## CHSR Wildlife Under Crossing as Needed

This is an example of providing wildlife under passing. The underpass has open access with trees, shrubs, and greenery to copy the approach sides.

## CHSR Wildlife Crossing as Needed

This is an example to provide wildlife overpassing. The overpass is fenced with trees, shrubs, and greenery to copy the approach sides.

## CHSR Miles between Portland and Centralia, WA

| On Ground | Cut/Fill | Flyover or Bridges | Tunnels or Underpass |
|---|---|---|---|
| 0.23 Mi Po_013 BNSF * | 0.27 Mi Po_010 new | 0.70 Mi Po_001 new | 1.10 Mi Po_003 new |
| 1.16 Mi Po_020 BNSF | 0.12 Mi Po_011 new | 3.00 Mi Po_002 new | 0.10 Mi Po_008 new |
| | | 3.82 Mi Po_004 UPRR/BNSF | |
| | 0.10 Mi Po_015 BNSF | 1.32 Mi Po_006 BNSF | 1.11 Mi Po_012 new |
| | 0.57 Mi Po_016 BNSF | 0.79 Mi Po_007 BNSF * | 0.51 Mi Po_014 new |
| | 1.00 Mi Po_018 BNSF | 0.20 Mi Po_009 new | 0.56 Mi Po_017 new |
| | 2.10 Mi Po_021 BNSF * | 0.39 Mi Po_019 BNSF | 0.79 Mi Po_025 new |
| | 0.44 Mi Po_022 new | 0.17 Mi Po_020a BNSF | 0.10 Mi Po_027 new |
| | 0.16 Mi Po_022b new | 0.10 Mi Po_022a new | 2.82 Mi Po_029 new |
| | 0.19 Mi Po_022d new | 0.12 Mi Po_022c new | 4.43 Mi Po_034 new |
| | 0.45 Mi Po_023 BNSF | 0.10 Mi Po_022e new | 0.10 Mi Po_036 I-5 |
| | 2.18 Mi Po_031 BNSF * | 0.13 Mi Po_024 new | 1.00 Mi Po_039 new |
| | 0.39 Mi Po_033 new | 0.12 Mi Po_026 new | 0.84 Mi Po_043 new |
| | 1.14 Mi Po_035a new | 0.10 Mi Po_028 new | 2.00 Mi Po_045 new |
| | 0.56 Mi Po_038 I-5 | 0.51 Mi Po_030 new | 0.20 Mi Po_050 new |
| | 0.53 Mi Po_041 new | 4.51 Mi Po_032 new | 2.70 Mi Po_058 new |
| | 1.17 Mi Po_047 I-5 | 0.99 Mi Po_037 I-5 | 0.98 Mi Po_063 I-5 |
| | 0.10 Mi Po_049 new | 1.92 Mi Po_040 I-5 * | 3.47 Mi Po_068 new |
| | 0.60 Mi Po_052 new | 1.48 Mi Po_042 new * | 2.42 Mi Po_071 new |
| | 0.39 Mi Po_053 I-5 | 0.76 Mi Po_044 new * | |
| | 1.25 Mi Po_054 I-5 | 3.35 Mi Po_046 I-5 * | |
| | 0.71 Mi Po_055 I-5 | 0.13 Mi Po_048 new | |
| | 0.55 Mi Po_056 I-5 | 1.00 Mi Po_051 new | |
| | 0.87 Mi Po_059 I-5 | 1.41 Mi Po_057 new * | |
| | 1.42 Mi Po_060 I-5 * | 1.47 Mi Po_061 new | |
| | 0.38 Mi Po_062 I-5 | 0.39 Mi Po_064 I-5 | |
| | 0.26 Mi Po_065 I-5 | 6.00 Mi Po_073 new | |
| | 0.80 Mi Po_066 new | 3.13 Mi Po_075 BNSF | |
| | 0.64 Mi Po_067 new | | |
| | 0.83 Mi Po_069 I-5 | | |
| | 0.97 Mi Po_070 I-5 | | |
| | 1.45 Mi Po_072 I-5 | | |
| | 0.39 Mi Po_074 new | | |
| **1.39 Miles** 1.58 % | **22.98 Miles** 26.20 % | **38.11 Miles** 43.45 % | **25.23 Miles** 28.76 % |
| | | | **87.71 Miles Total HSR** |
| | | | **93 Miles Total Amtrak** |

New and existing Right of Way (RoW)

| | |
|---|---|
| 49.47 miles in a new corridor | 38.24 miles in an existing right of way, BNSF, or Hwy |
| 56.40 % of this CHSR RoW must be acquired | 43.60% may be shared |
| Tunnel miles may be excluded from the RoW purchase. | |

* = Some deviations, as some miles are aside from the named corridor segment.

## CHSR Miles between Centralia, WA, and Seattle Central Station

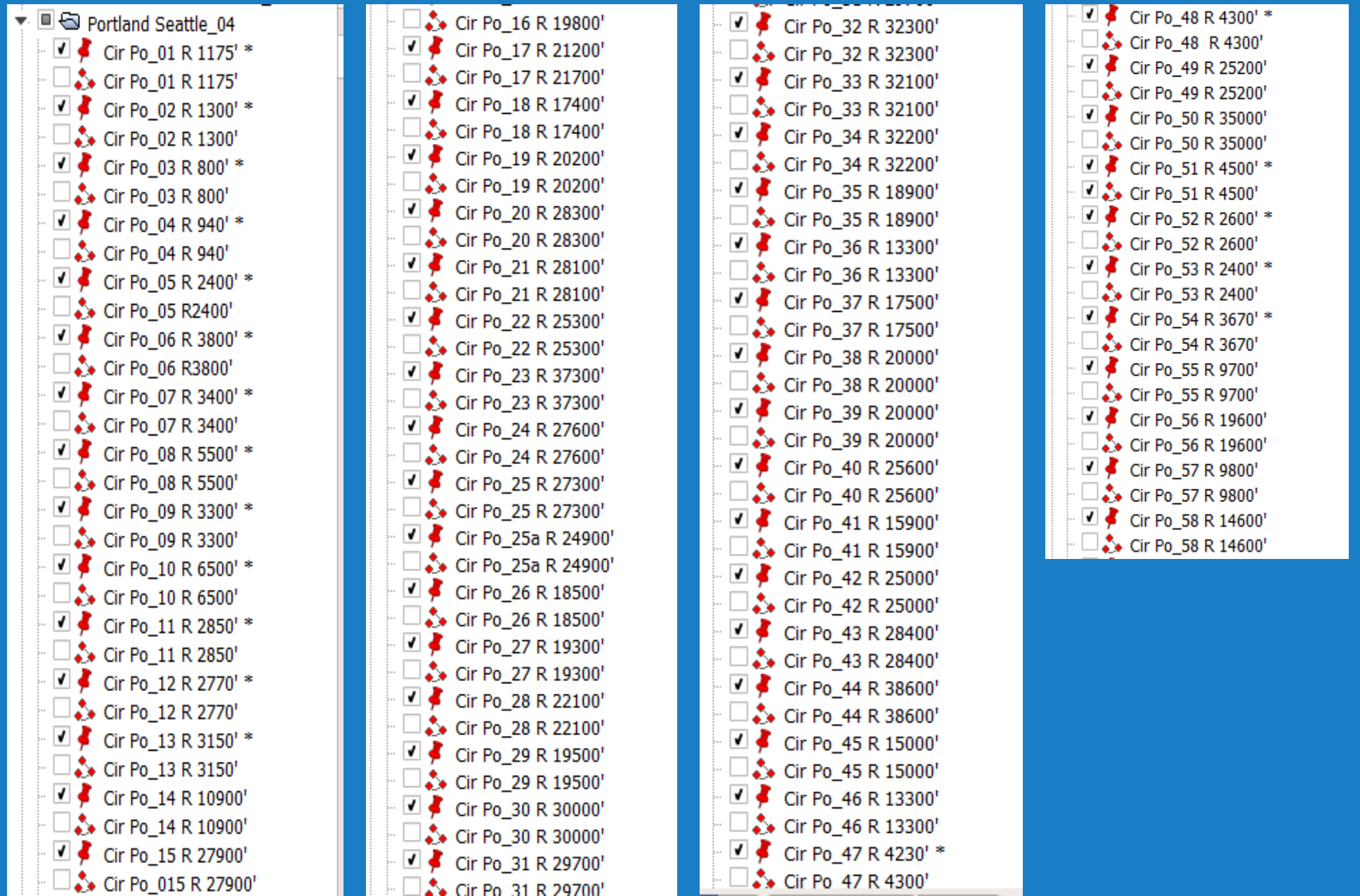
| On Ground | Cut/Fill | Flyover or Bridges | Tunnels or Underpass |
|---|---|---|---|
| 0.77 Mi Po_086 Hwy 507 | 0.74 Mi Po_077 new | 1.34 Mi Po_076 BNSF | 1.14 Mi Po_079 new |
| 1.56 Mi Po_097 BNSF | 1.45 Mi Po_081 BNSF | 0.62 Mi Po_078 new | 0.96 Mi Po_083 new |
| 2.42 Mi Po_102 BNSF | 0.94 Mi Po_084 new | 0.82 Mi Po_080 BNSF * | 0.68 Mi Po_090 new |
| 0.22 Mi Po_102b BNSF | 0.26 Mi Po_087 Hwy 507 | 0.35 Mi Po_082 new | 0.55 Mi Po_098 new |
| 0.43 Mi Po_102d BNSF | 0.11 Mi Po_089 new | 0.72 Mi Po_085 new | 0.91 Mi Po_104 new |
| | 0.24 Mi Po_092 BNSF | 1.33 Mi Po_088 BNSF * | 8.59 Mi Po_106 new |
| | 0.20 Mi Po_094 BNSF | 1.00 Mi Po_091 new | 1.66 Mi Po_108 Pac Hwy |
| | 3.22 Mi Po_095 BNSF | 0.05 Mi Po_093 BNSF | 3.67 Mi Po_109 PC/I-5 |
| | 0.21 Mi Po_099 new | 0.79 Mi Po_096 new | 3.58 Mi Po_110 new * |
| | 0.34 Mi Po_101 BNSF | 0.05 Mi Po_100 BNSF | 0.57 Mi Po_114 new |
| | 1.74 Mi Po_103 BNSF * | 0.10 Mi Po_102a BNSF | 6.53 Mi Po_116 new |
| | 1.00 Mi Po_107 I-5 | 1.13 Mi Po_102c BNSF | 2.42 Mi Po_122 new |
| | 0.32 Mi Po_111 new | 0.71 Mi Po_105 new | 3. 51 Mi Po_127 new * |
| | 1.48 Mi Po_118 SP&S | 0.77 Mi Po_112 new | |
| | 1.10 Mi Po_119 SP%S | 2.64 Mi Po_113 new | |
| | 0.10 Mi Po_120 new | 0.59 Mi Po_115 new | |
| | | 6.10 Mi Po_117 new, Hwy 167 and former SP&S | |
| | 0.12 Mi Po_121 new | 1.42 MI Po_124 I-5, BNSF | |
| | 0.53 Mi Po_123 I-5, BNSF | 0.59 Mi Po_126 I-5, BNSF | |
| | 0.33 Mi Po_125 I-5, BNSF | | |
| **5.40 Miles** 7.13 % | **14.43 Miles** 19.06 % | **21.12 Miles** 27.89 % | **34.77 Miles** 45.93 % |
| | | | **75.72 Miles Total CHSR** |
| | | | **(79.72 via SeaTac) CHSR** |
| | | SeaTac Corridor | |
| | | 1.64 Mi Po_127a3 new | |
| | | | 4.00 Mi Po_127a2 new |
| | | 2.11 Mi Po_127a1 new | |
| | | **3.75 Miles SeaTac CHSR** | **4 Miles** |
| | | | **7.75 Miles Total** |
| | | | **94 Miles Amtrak** |

New and existing Right of Way (RoW) declaration.

| | |
|---|---|
| 39.84 miles in a new corridor | 39.88 miles in an existing right of way, BNSF, or Hwy |
| 49.98 % of this CHSR RoW must be acquired. | 50.03 % may be shared |
| Tunnel miles may be excluded from RoW purchase. | |

* = Some deviation, as some miles are aside from the named corridor segment.

# CHSR corridor radius data between Portland, OR, and Seattle Central, WA




The short radii near the CHSR stations are tolerable because all trains stop there.

3.8 miles south of the Centralia CHSR station is the Chehalis CHSR curve, with a radius of 13,300 ft and a speed limit of 160 mph. This through-train speed reduction can be managed by the train operator, who has onboard signal information. Increasing the curve radius is challenging.

Cir Po_ numbers with * are near stations.

Please see below the educational videos of tunnel-boring machines for different geology. (Skip advertising)

(25) TBM Variable (25) TBM Variable Density® EN - YouTube® EN - YouTube

Tunnel Boring Machine (TBM) animation. - YouTube