EXISTING 3 LANE ROADWAY EXAMPLES

N 155th St East of Aurora | 12,400 vehicles per weekday

Seattle Stone Way: N 34th St to N 50th St | 15,100 vehicles per weekday

- ✓ Injury collisions reduced by 33%
- ✓ Speeds reduced 3% southbound (downhill) and 8% northbound (uphill)
- ✓ Top end speeders (10+ mph over the posted speed limit) reduced 75%
- ✓ Bicycle volumes increased 35%
- ✓ Pedestrian collisions reduced 80%
- ✓ Traffic Volumes on Neighborhood Streets down by 12-34% (no signs of cut through traffic)

N 205th St West of Aurora | 13,500 vehicles per weekday (2011 data)

- ✓ Collisions reduced by 45%
- ✓ Speeds reduced 9 percent eastbound and 11% westbound
- ✓ Top end speeders (10+ mph over the posted speed limit) reduced 75% eastbound and 79% westbound
- ✓ Traffic volumes increased 3%
- ✓ Travel times unchanged
- ✓ Steep hill for 10 blocks

Seattle NE 75th St: 15th NE to 35th NE | 16,900 - 21,300 vehicles per weekday

MAXIMUM ACCEPTABLE STANDARD FOR DELAY (CONCURRENCY)

WA State Growth Management Act

"Under RCW 36.70A.040, local jurisdictions must adopt and enforce ordinances which prohibit development approval if the development causes the level of service on a locally owned transportation facility to decline below the standards adopted in the transportation element of the comprehensive plan, unless transportation improvements or strategies to accommodate the impacts of development are made concurrent with the development."

Shoreline's Adopted Level of Service Standard

*"A. **Level of Service.** The level of service standard that the City has selected as the basis for measuring concurrency is as follows:*

1. *LOS D at signalized intersections on arterial streets and at unsignalized intersecting arterials; and*
2. *A volume to capacity (V/C) ratio of 0.90 or lower for principal and minor arterials.*

The V/C ratio on one leg of an intersection may exceed 0.90 when the intersection operates at LOS D or better.

These level of service standards apply throughout the City unless an alternative level of service for a particular street or streets has been adopted in the Comprehensive Plan Transportation Element."

V/C Ratio Explained

$$\frac{V}{C}$$

V ← Peak hour directional volume (vehicles per hour)

C ← Peak hour directional capacity, based on regional traffic models and Highway Capacity Manual
Shoreline streets range from 600 – 1000 vehicles per hour per lane

Proposed developments and City projects must meet these standards, unless otherwise asdopted by City Council.

Intersection Level of Service (LOS) Explained

Level of Service (LOS)	Average Delay (seconds per vehicle)	Description
A	>= 10	Free flow (not a desirable operating LOS; indicates that the roadway or intersection is overbuilt)
B	>10-20	Stable flow (slight delay)
C	>20-35	Stable flow (acceptable delay)
D	>35-55	Approaching unstable flow (speeds somewhat reduced, more vehicles stop and may wait through more than one cycle before proceeding)
E	>55-80	Unstable flow (speeds reduced and highly variable, queues occur, many vehicles have to wait through more than one signal cycle before proceeding)
F	>80	Forced flow (jammed conditions, long queues occur that do not clear, most vehicles wait through more than one signal cycle before proceeding)

POINT WELLS

It would not be prudent for the City to postpone necessary safety and mobility improvements because of a yet to be approved development.

The development's traffic impacts are still undetermined and will not occur for at least a decade or more.

- Based on traffic analysis, fewer lanes through the corridor means less traffic can be added to the system within the City's current level of service requirements. This means fewer additional vehicular trips could be added by development without providing mitigation or modifications to the development in order to meet the City's current level of service standard.

- City of Shoreline staff will continue to review any submittals to Snohomish County for consistency with the City's adopted plans and regulations applicable to this development and previously submitted staff comments on the project.

- For more detailed project history, visit the City of Shoreline and Snohomish County Point Wells websites.

SCHEDULE & BUDGET

Dates to Remember!

Formal Comment Period Closes: August

Design Public Meeting: Fall 2018

Construction: Spring 2018 as weather allows

Budget

Estimated Construction Cost: $220,000

Construction Method: Contractor

Funding Source: Roads Capital Fund

Sign up for ALERT Shoreline on the City's website to stay informed of project updates!

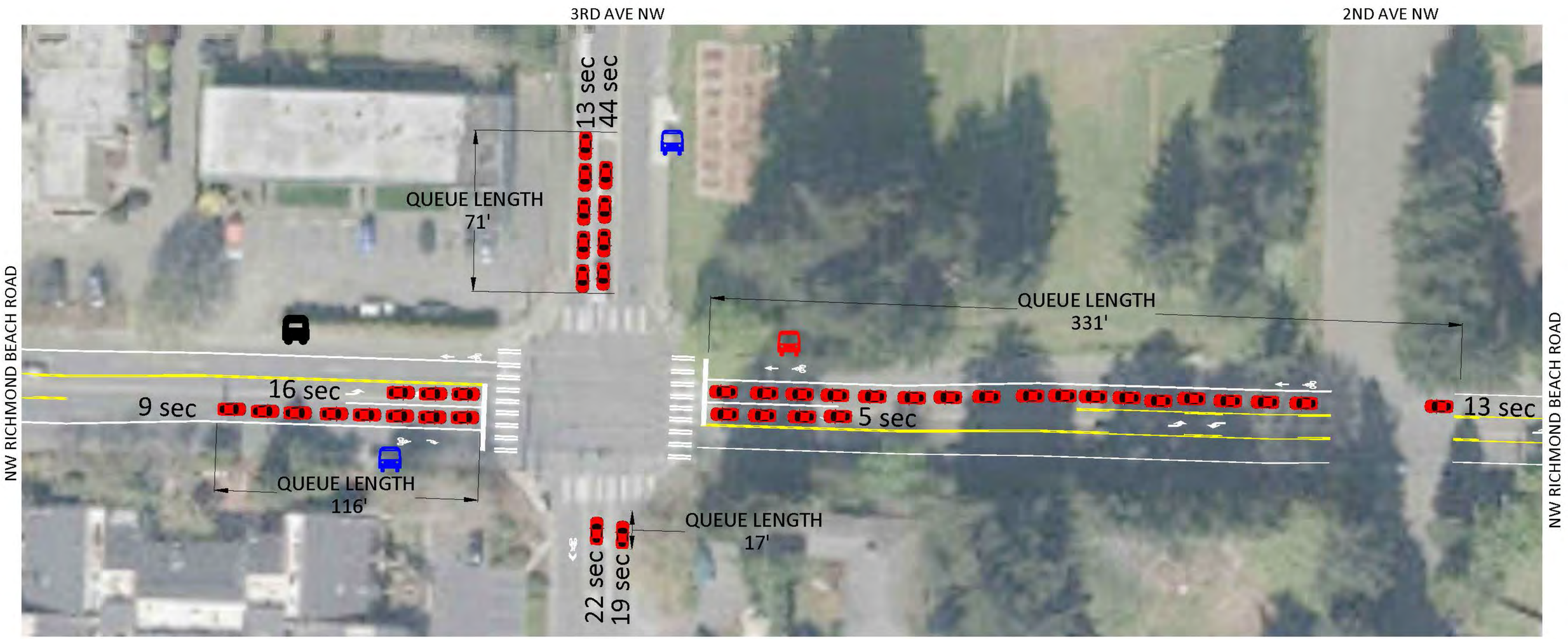
RICHMOND BEACH ROAD RECHANNELIZATION

shorelinewa.gov/RBRechannelization

3RD AVENUE NORTHWEST - INTERSECTION OPTIONS

3RD AVE NW ASYMMETRICAL DESIGN SHOWN

> Provides space for bus pull outs; requires removal of bus stop shown in black and addition of bus stop shown in red.
> Builds upon signal timing changes made in 2016.
> See diagram below for estimated wait times and queue lengths during the busiest travel time (4pm-6pm)
> A symmetrical design could be used at this intersection that would maintain existing bus stop locations and have the same delay and queue lengths



RICHMOND BEACH ROAD RECHANNELIZATION

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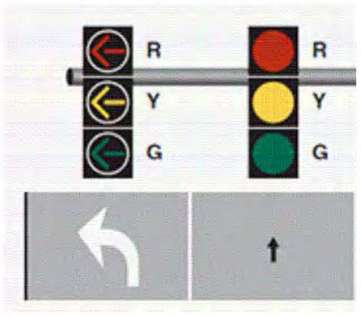
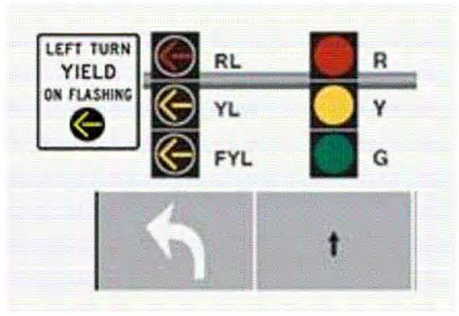
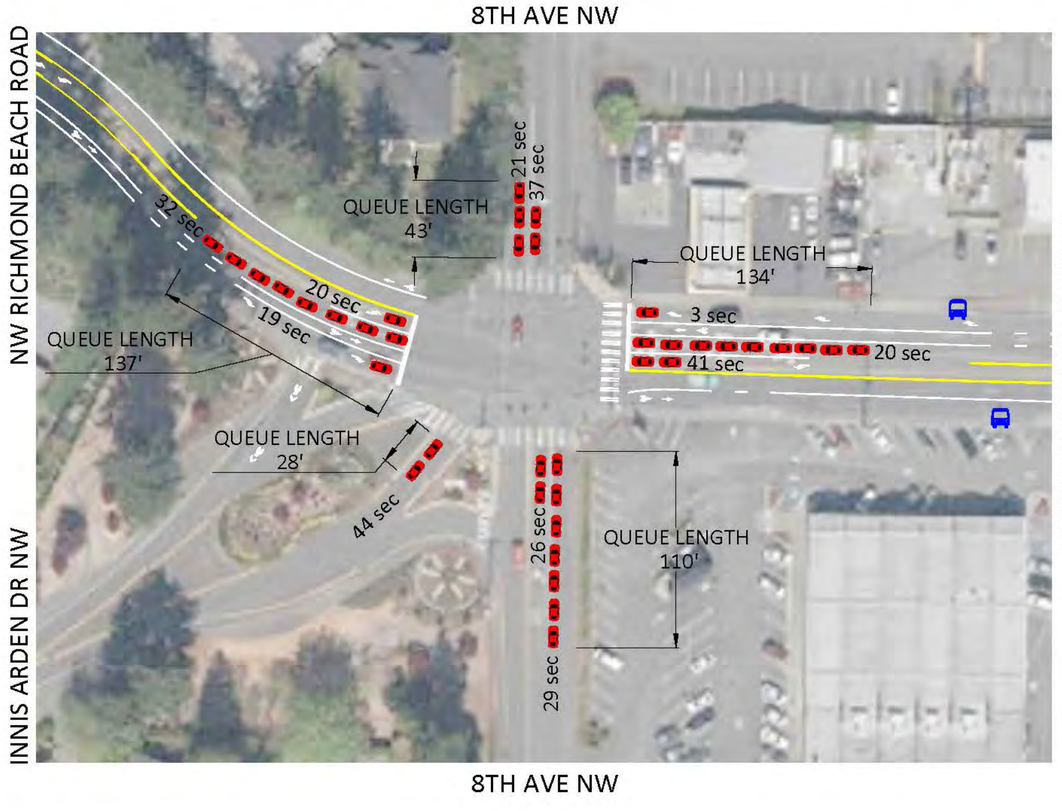
8TH AVENUE NORTHWEST - INTERSECTION OPTIONS

OPTION A - EXISTING NORTHBOUND/SOUTHBOUND SIGNAL PHASING
"Split phasing" - only one leg of travel uses the intersection at a time



OPTION B - POTENTIAL NORTHBOUND/SOUTHBOUND SIGNAL PHASING
Flashing Yellow Arrow - allows 8th Ave NW northbound and southbound go at the same time





RICHMOND BEACH ROAD RECHANNELIZATION

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15TH AVENUE NORTHWEST - INTERSECTION OPTIONS

OPTION A - TIGHTEN UP EXISTING INTERSECTION

> Lower construction cost
> Right turn pocked on south leg could be used as a space for public art
> Pedestrians are less exposed on the south leg
> Does not decrease pedestrian exposure on the north leg
> Provides space for a pedestrian refuge when crossing Richmond Beach Road
> See diagram below for estimated wait times during the busiest travel time (4pm-6pm)

OPTION B - CHANGE INTERSECTION CONFIGURATION

> Prevents fast right turns from Richmond Beach to 15th
> Eliminates the need for vehicles to make two turns when continuing on 15th
> Driveway to parking lot would no longer be part of the intersection
> Requires the relocation of the flashing beacon above the intersection
> See diagram below for estimated wait times during the busiest travel time (4pm-6pm)

RICHMOND BEACH ROAD RECHANNELIZATION

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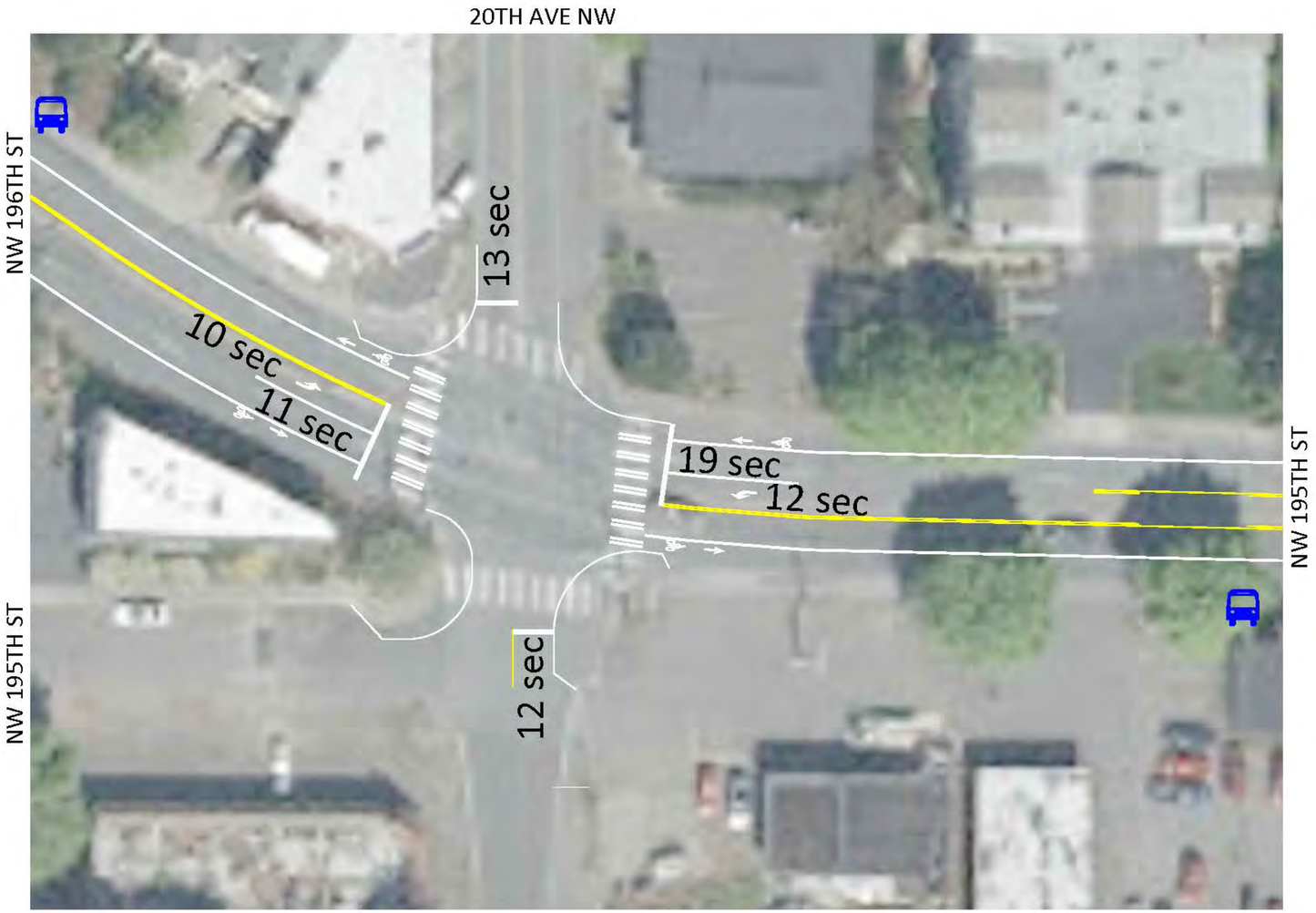
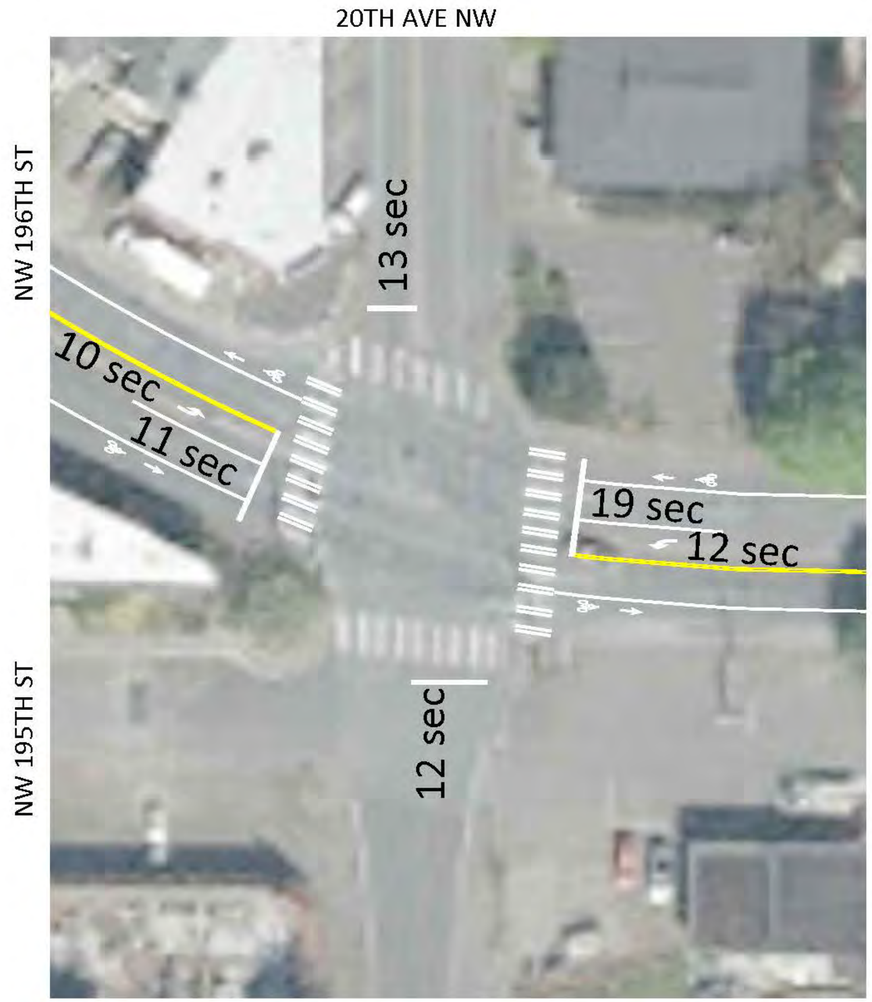
20TH AVENUE NORTHWEST - INTERSECTION OPTIONS

OPTION A - SHIFT AND TIGHTEN
> Provides space for bus turn out while maintaining existing bus stop locations
> Utilizes wider bike lane space to provide painted "curb bulbs" which shorten pedestrian crossings
> Provides left turn pockets to 20th Ave NW
> See diagram below for estimated wait times during the busiest travel time (4pm-6pm)



OPTION B - SYMMETRICAL DESIGN
> Provides left turn pockets to 20th Ave NW
> Lower construction cost
> See diagram below for estimated wait times during the busiest travel time (4pm-6pm)



RICHMOND BEACH ROAD RECHANNELIZATION

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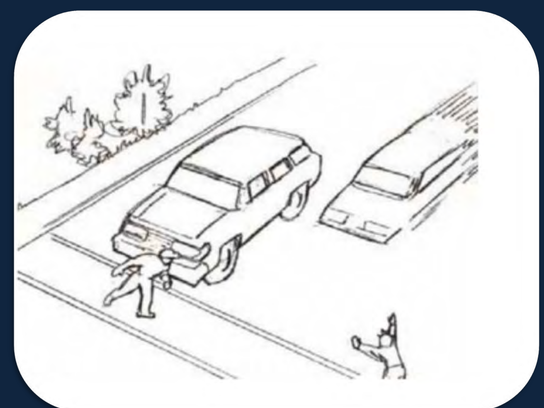
PEDESTRIAN & BICYCLIST SAFETY BENEFITS

Over 90% of pedestrian collisions occur when people cross the road

(few are struck walking along the sidewalk).

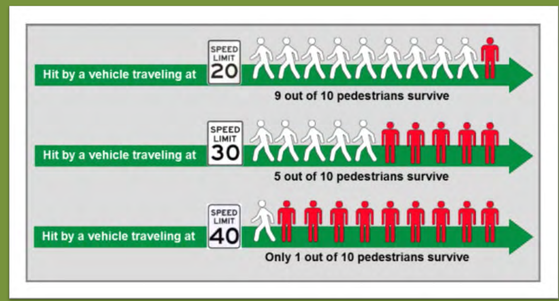
Where the center lane space is not needed or turns are low, “pedestrian refuge” space can be striped for safer crossing. →

Eliminates pedestrian multi-lane threat scenario where one vehicle stops, but the adjacent driver fails to see the pedestrian crossing in front of the stopped car. →



← Bike lane provides **additional space between pedestrians and vehicle** traffic.

Reduces speeding → a primary factor in pedestrian crash survival. Reduced speeding also improves safety for bicyclists and drivers



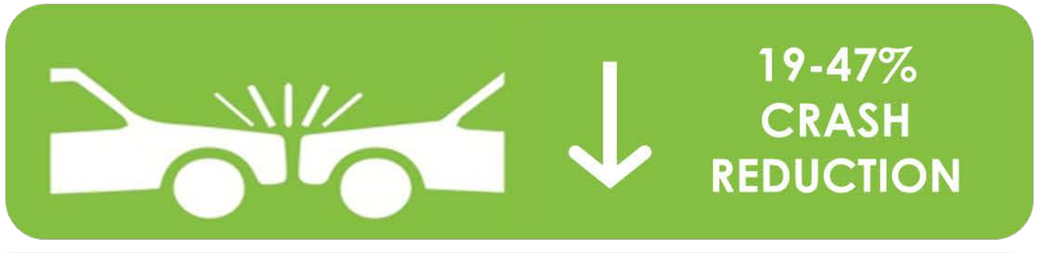
VS.

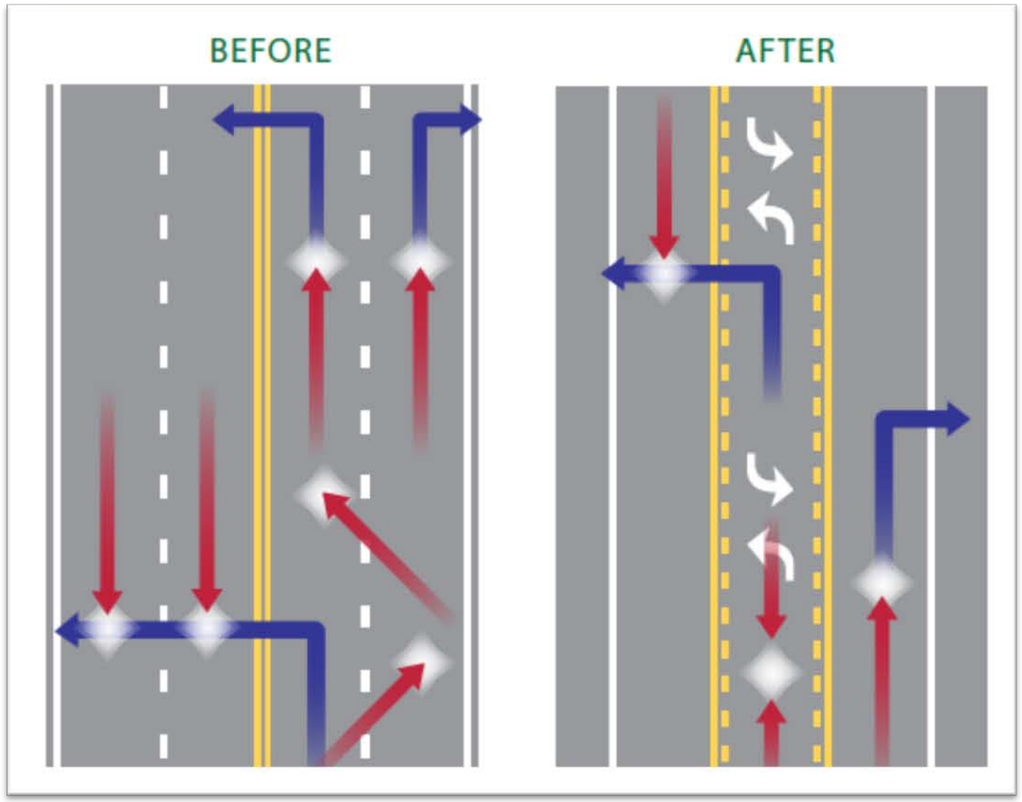
← Bike lane markings provide the expectation for drivers to encounter bicyclists, improving their awareness and **attentiveness to bicyclists** while driving.

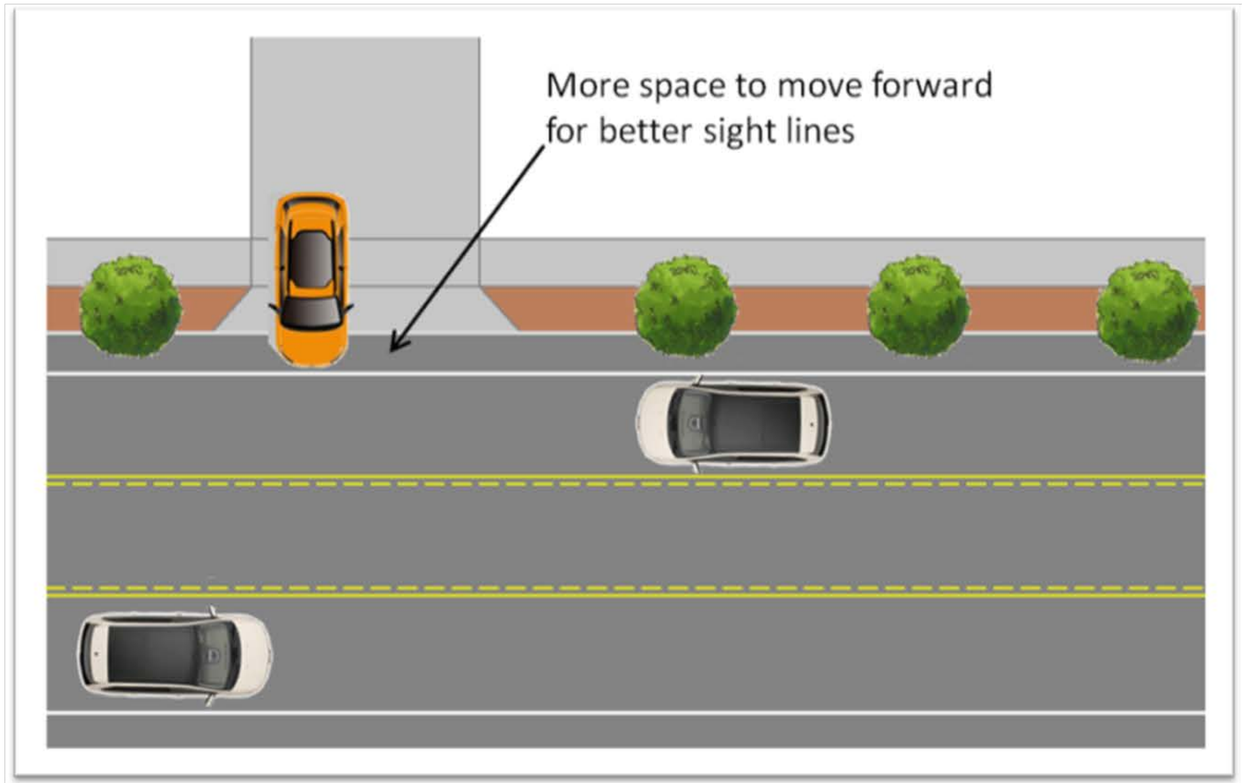
Less lanes to cross = safer reduced pedestrian exposure

DRIVER SAFETY BENEFITS

- ✓ **Reduces speeding** and speed differential, a main cause of collisions, and significant factor in injuries
- ✓ **Reduces conflict points** and provides dedicated left turn space as shown below
- ✓ **Improved sight distance** when turning from a side street/driveway or from the mainline
- ✓ Aggregated case studies throughout the country show **19-47% crash reduction**





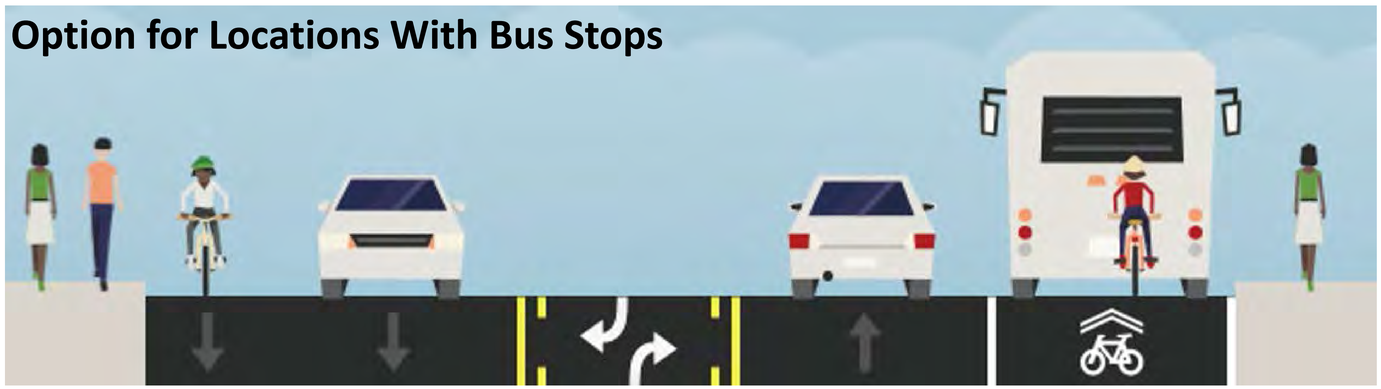


BUSES AND OTHER BLOCKAGES

Buses

Lanes can be narrowed and the striping shifted to allow for a wider bus stop/bike lane area so that buses can be fully outside of the travel lane when picking up passengers. This is recommended at busier intersections, but other locations may benefit from full lane widths, where passing a stopped bus can be done safely and without delay.

Option for Locations With Bus Stops



Benefits: At busier intersections, like 3rd, 8th, and 15th, where the left turn lane is often occupied, this configuration allows cars to pass buses as buses are fully contained within the bike lane/pull out space.

Drawbacks: Requires narrowing the rest of the lanes. Resulting lane widths are acceptable, but not ideal for long stretches or for curves in the roadway. At locations where the left turn lane is infrequently occupied, cars can easily go around using just a small portion of the center turn lane. This configuration doesn’t address other infrequent and short duration blockages such as package delivery or garbage trucks.

Other Blockages

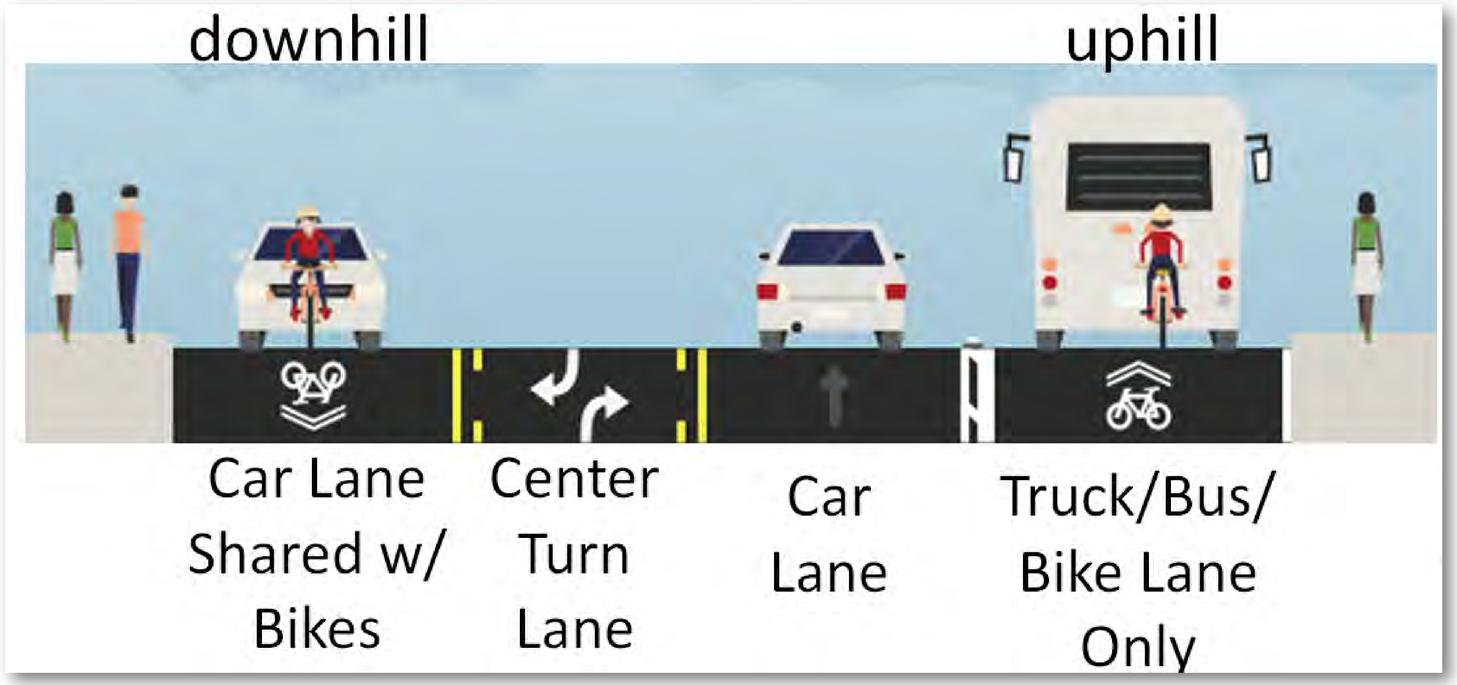
It is not illegal to go around stopped, blocking vehicles. This is how every 2 or 3 lane roadway functions, some with traffic volumes higher than this corridor.

Shown to the right, is a garbage truck stopped on 15th Ave NE. Even though it is stopped a significant distance from the curb, passing cars only have to utilize part of the little utilized center turn lane to go around – with plenty of ability to see potential conflicts. The same holds true for the segments of the Richmond Beach Road corridor where these vehicles are servicing single residences and can’t pull off.

You will have plenty of ability to see oncoming cars, even better than your current ability to see cars in the adjacent lane, when you change lanes to pass blockages now.

SLOW MOVING VEHICLES

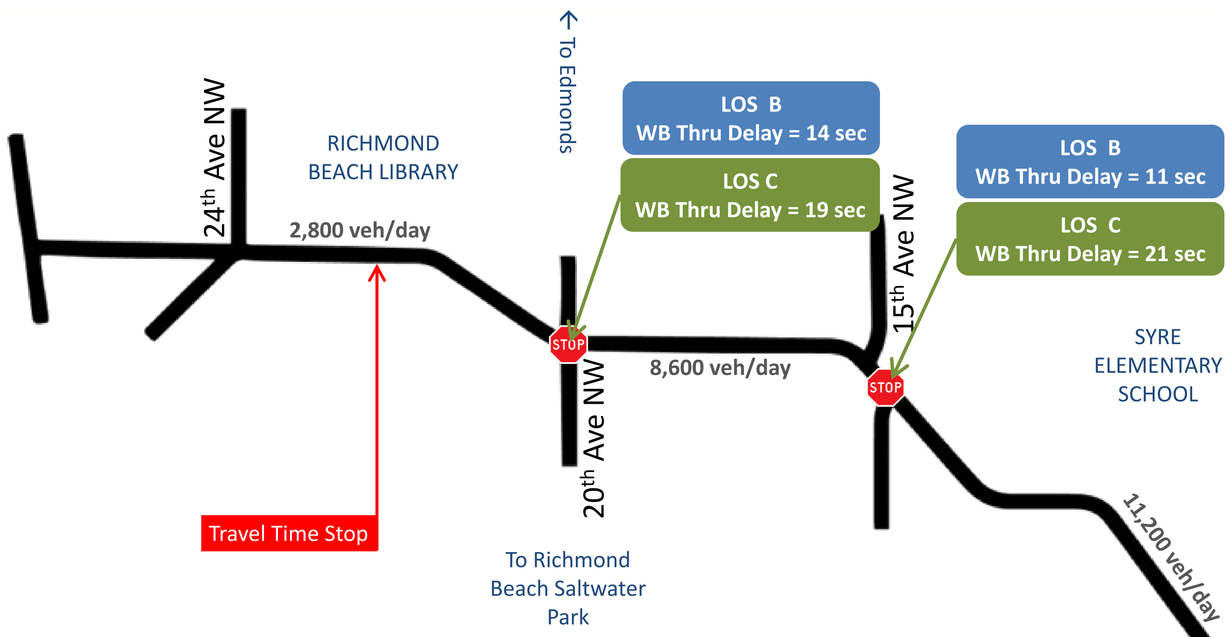
- It is illegal for slow moving vehicles to hold up more than 5 vehicles; The wider bike lane proposed for bus stops could serve as truck pullouts.
- The City has some regulatory authority on truck operations and can develop a strategy for operations if needed.
- Contingency plan concept if slow moving vehicle delay proves to be a bigger impact than anticipated as shown below.
- **Only 5-7 tanker trucks a day** (staggered) as documented by traffic count data and previous transportation studies; chances of encountering one would be rare.
- Buses were documented traveling at the speed limit up the hill.

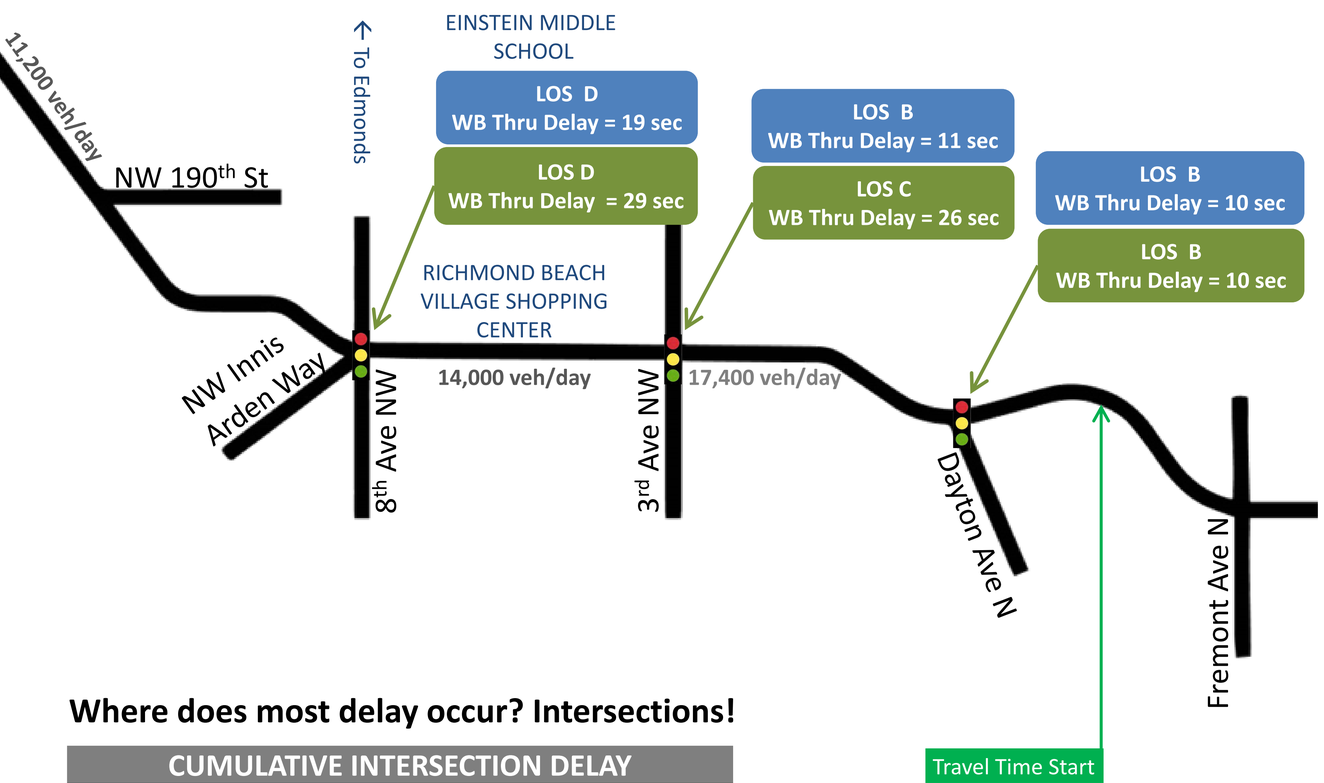


We are working to capture the speed of a tanker truck up the hill, however the low frequency of trucks makes this difficult. It will be documented before the second open house.

Below is NE 75th St in Seattle - large hill with the same roadway configuration. Many other regional examples have significant topography.

TRAVEL TIME DELAY & INTERSECTION LEVEL OF SERVICE





LEGEND

Overall 2017 PM Peak Intersection Level of Service →
Average PM Peak Westbound Thru Movement Delay →

EXISTING CONFIGURATION
LOS C
WB Thru Delay = 14 sec

PROPOSED CONFIGURATION
LOS C
WB Thru Delay = 19 sec

TRAVEL TIME WESTBOUND THROUGH CORRIDOR DURING PM PEAK[1]

From West of Fremont Ave N to 23rd Ave NW

EXISTING 4 LANE CONFIGURATION AVERAGE TRAVEL TIME

- Based on traffic model: 4 minutes 25 seconds
- Based on actual travel times[1]: 4 minutes 30 seconds
- Average travel speed: 22 mph

PROPOSED 3 LANE CONFIGURATION AVERAGE TRAVEL TIME

- Based on model: 5 minutes 16 seconds
- Average travel speed: 20 mph

PROJECTED TRAVEL TIME INCREASE = 51 SECONDS

PROJECTED AVERAGE TRAVEL SPEED DIFFERENCE = 2 MPH

[1] Intersections modeled based on configurations shown in roll plot. Alternative intersection phasing for 8th Ave NW would result in travel time savings for the proposed option.
[2] Travel times collected Tue-Thu from 4:45 to 5:30 PM.

Where does most delay occur? Intersections!

CUMULATIVE INTERSECTION DELAY	
Existing	Proposed[1]
63 Seconds	103 Seconds

Anticipated slower travel speed through the corridor only accounts for **11 seconds** of delay on average.

INJURY COLLISIONS (2010-2016)

- **20 injury collisions (9 in last 3 years)**
- **<u>Societal cost of each injury collision $100,000 – $2,000,000</u>**
- **Fatality occurred between 8th Ave NW and 3rd Ave NW**
- **8 of these injuries were pedestrians or bicyclists**

TOTAL COLLISIONS (2010-2016)

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- 154 Collisions
- 3rd Ave NW remains a high collision location, despite improvements.
- Many collisions between 8th Ave NW and 3rd Ave NW related to vehicles turning from driveways.

PEDESTRIAN & BICYCLIST COLLISIONS (2010-2016)

Date Printed: 6/15/2017 | Author: bcabe | Path: J:\GIS\Projects\Traffic\Collisions\mxd\RichmondBeachRdRechannel\RichmondBeachRdRechannelPed.mxd

10 Pedestrian Collisions, including one fatality

3 Bicyclist vs. vehicle collisions in last 3 years, all resulting in injury.

Date Printed: 6/15/2017 | Author: bcabe | Path: J:\GIS\Projects\Traffic\Collisions\mxd\RichmondBeachRdRechannel\RichmondBeachRdRechannelBike.mxd

BICYCLE SYSTEM PLAN (2011)