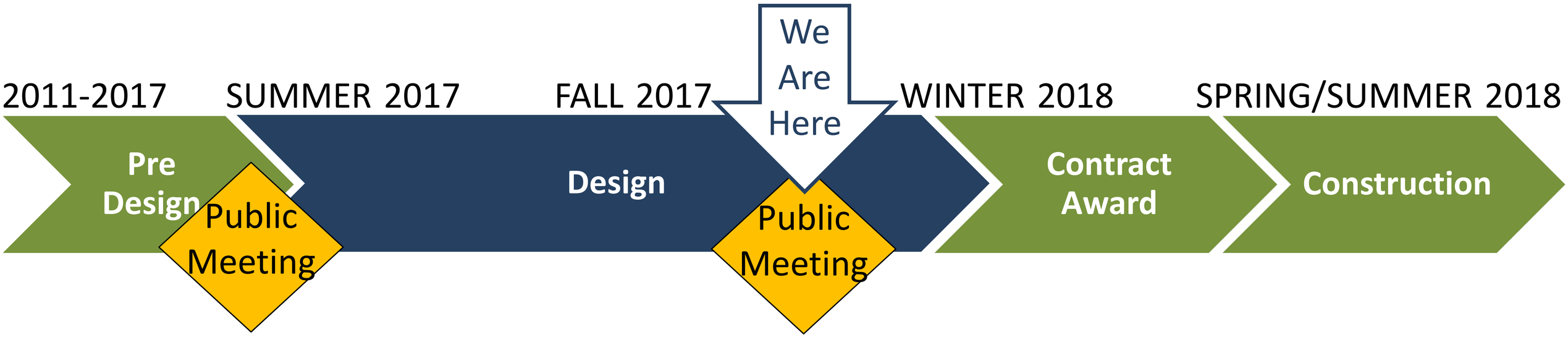
SCHEDULE & BUDGET



Budget

Estimated Construction Cost: $300,000

Construction Method: Contractor

Funding Source: Roads Capital Fund

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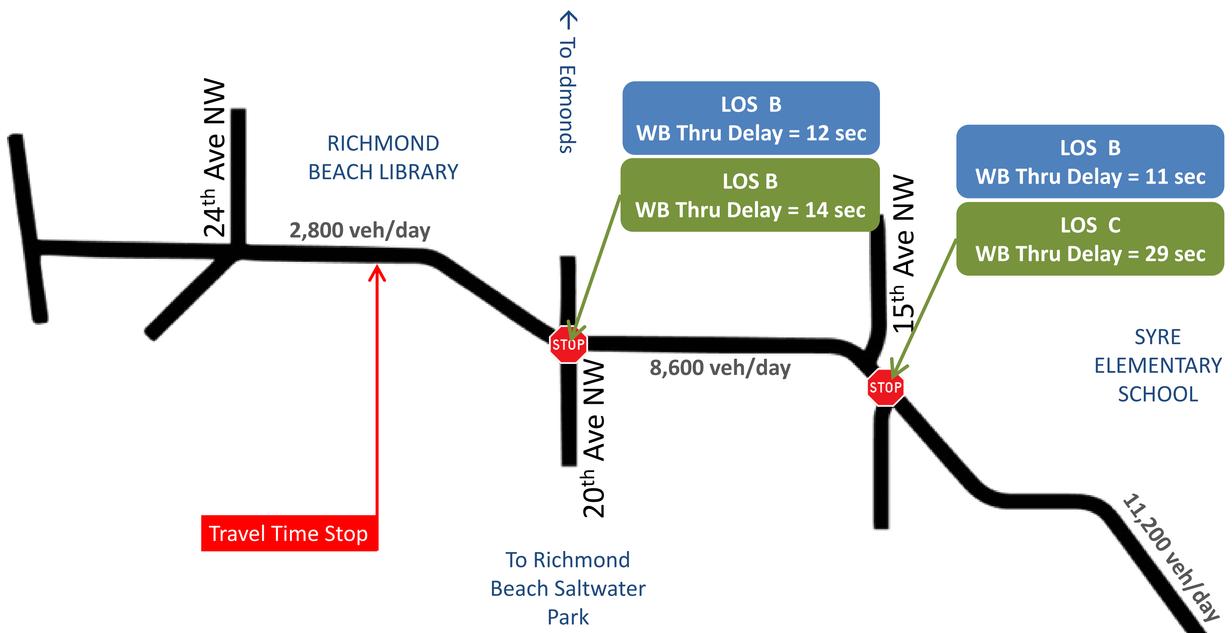
PM TRAVEL TIMES & INTERSECTION LEVEL OF SERVICE

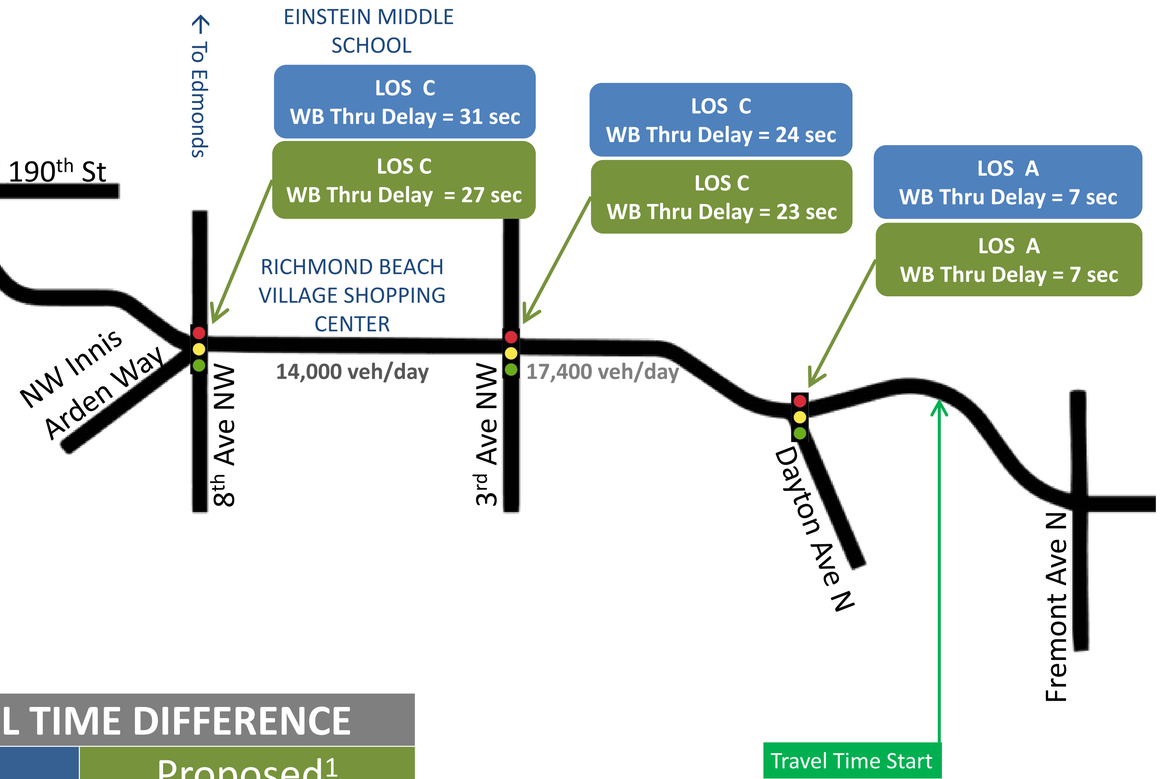


LEGEND

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



PM PEAK - WESTBOUND TRAVEL TIME

From west of Fremont Ave N to 23rd Ave NW

EXISTING 4 LANE CONFIGURATION AVERAGE TRAVEL TIME

- Model travel time: 4 minutes 37 seconds
- Actual travel time[2]: 4 minutes 30 seconds
- Average travel speed: 24 mph

PROPOSED 3 LANE CONFIGURATION AVERAGE TRAVEL TIME

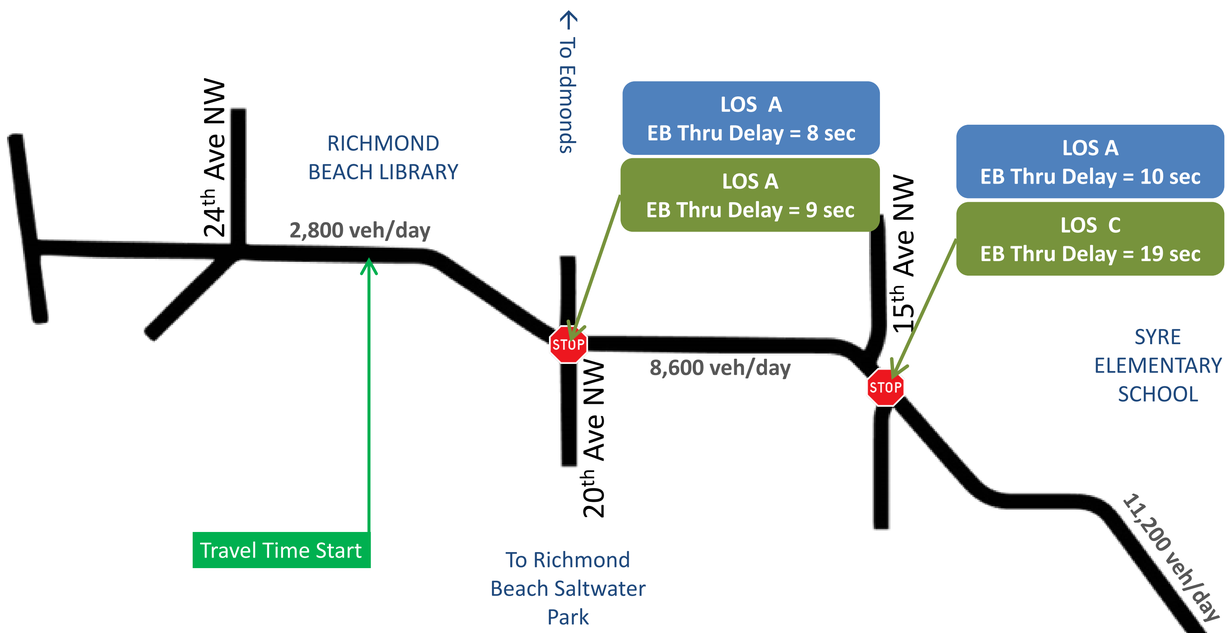
- Model travel time: 5 minutes 25 seconds
- Average travel speed: 21 mph

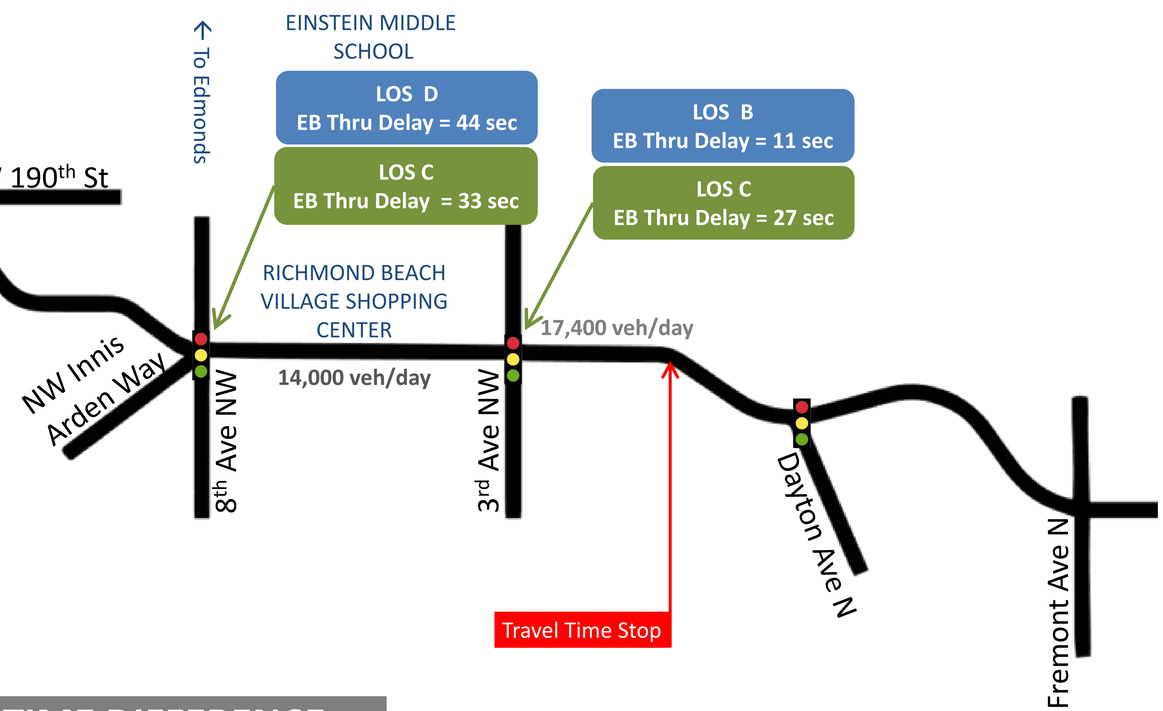
[1] Intersections modeled based on configurations shown in roll plot.
[2] Travel times collected Tue-Thu from 4:45 to 5:30 PM.

PM TRAVEL TIME DIFFERENCE	
Existing	Proposed[1]
4:37	5:25

Travel Time Difference = 48 seconds
Average Speed Difference = 4 mph

AM TRAVEL TIMES & INTERSECTION LEVEL OF SERVICE





LEGEND

Overall 2017 AM Peak Intersection Level of Service →
Average AM Peak Eastbound Thru Movement Delay →

EXISTING CONFIGURATION
LOS C
WB Thru Delay = 14 sec

PROPOSED CONFIGURATION
LOS C
WB Thru Delay = 19 sec

AM PEAK - EASTBOUND TRAVEL TIME

From west of Fremont Ave N to 23rd Ave NW

EXISTING 4 LANE CONFIGURATION AVERAGE TRAVEL TIME

- Model travel time: 4 minutes 3 seconds
- Actual travel time[2]: 3 minutes 55 seconds
- Average travel speed: 23 mph

PROPOSED 3 LANE CONFIGURATION AVERAGE TRAVEL TIME

- Model travel time: 4 minutes 45 seconds
- Average travel speed: 20 mph

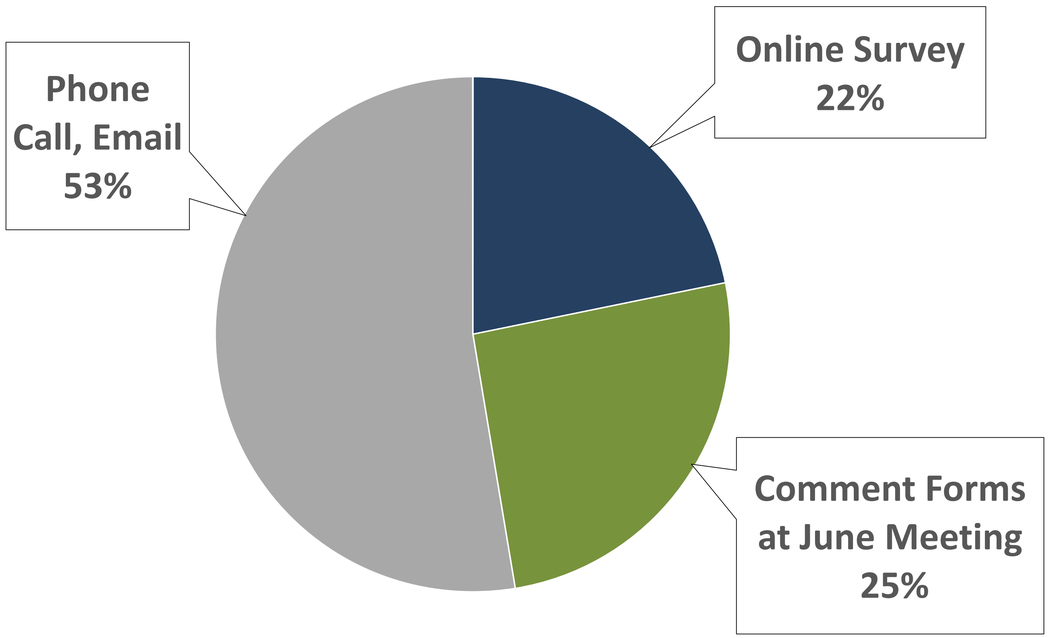
[1] Intersections modeled based on configurations shown in roll plot.
[2] Travel times collected Mon-Fri from 7:00 AM to 8:00 AM.

AM TRAVEL TIME DIFFERENCE	
Existing	Proposed[1]
4:03	4:45

Travel Time Difference = 42 seconds
Average Speed Difference = 3 mph

FEEDBACK SO FAR

How people have been providing feedback



Over 135 people have contacted us about this project

- Average daily traffic on the corridor is between 2,800 – 17,400 vehicles per day.
- More than 3,500 mailing addresses within ½ mile of the corridor.
- There has been a range of positive, negative, and neutral feedback →

What we've heard and how we've responded

The following are some examples of how your feedback has been incorporated into the updated design:

- ✓ Adding "Do Not Block the Intersection" sign at 2nd Ave NW
- ✓ Optimizing signal timing to reduce delay
- ✓ Providing wider lanes to accommodate bus pull outs
- ✓ Realigning 15th Ave NW intersection for safer turns from the north leg
- ✓ Minimizing parking removal to what is needed for safety
- ✓ Adding wayfinding signage for bikes to the trail
- ✓ Providing a bicycle facility for the project length
- ✓ Wider bus stops at intersections to prevent blocking

COMMON CONCERNS & RESPONSE SUMMARY

CONCERN	RESPONSE
More traffic delay	Modeling has been completed which shows less than a minute of added delay during the PM peak hour. Will monitor via before/after study.
Future growth	All future development must prove that it will not cause Shoreline standard traffic level of service failures, or provide improvements to meet standards.
Cut through traffic	Will monitor via before/after study and implement traffic calming as needed.
Emergency response delay	Not anticipated based on the availability of the center turn lane space, but will be monitored via before/after study.
Getting stuck behind buses at stops	Widened bus stop area so through traffic won't be blocked.
Getting stuck behind slow vehicles	Will track via before-after study. Video of corridor does not validate this concern. Back up plan for hill if this proves to be problematic.
Stopped delivery or garbage trucks	It is legal to go around stopped, blocking vehicles. Stopped vehicles will mostly be contained within the bike lane, leaving room for drivers to safely go around.
Head on collisions will increase	No head on injury collisions in any 3 lane configuration in analysis period (2010-2016). Not substantiated by other studies.
Not enough bicyclists to justify	This project is not being implemented to build bike lanes. It is being implemented to improve safety.

SEE FAQ's for complete response to these issues and more!

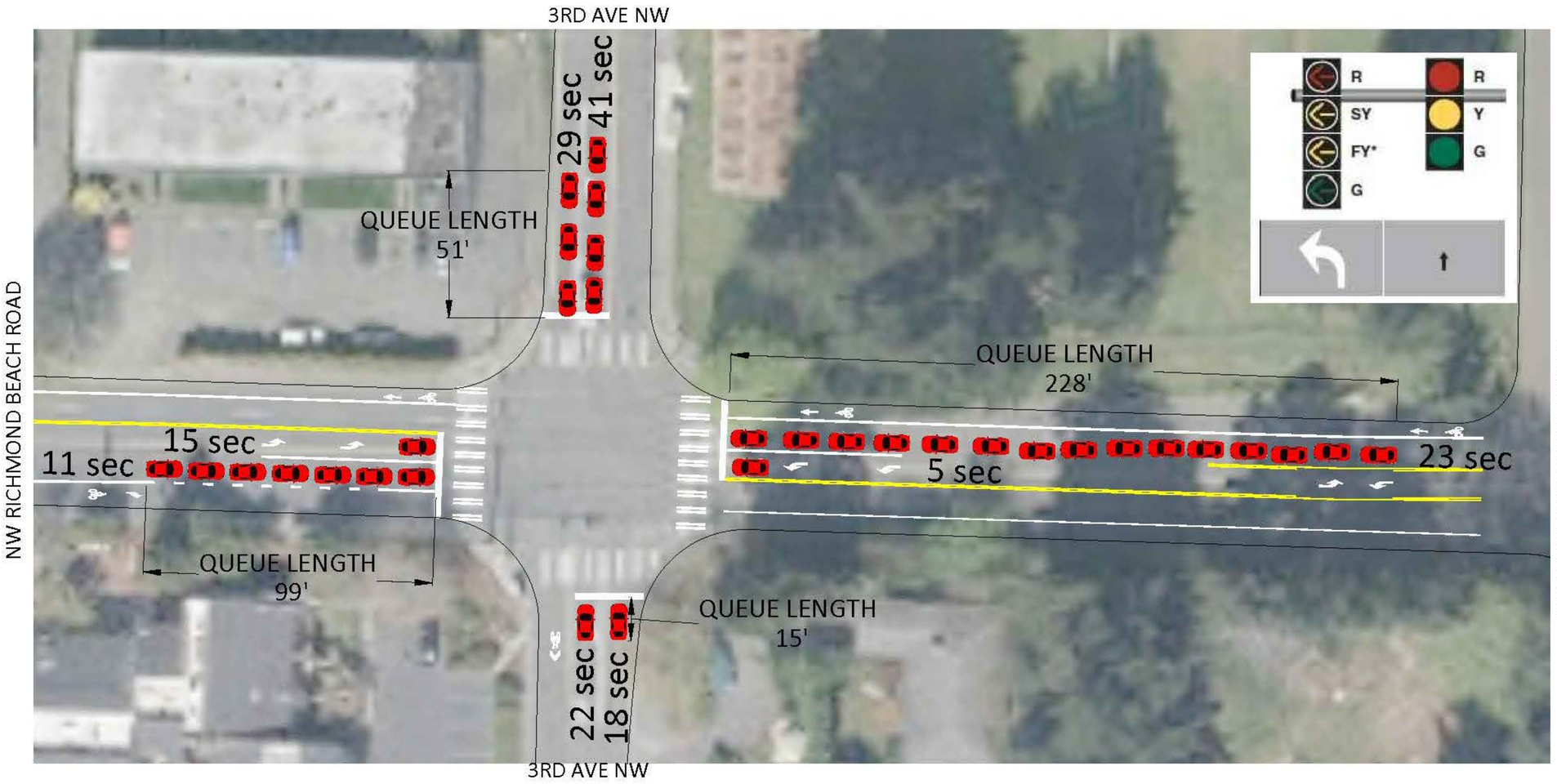
3rd Ave NW Intersection Design

60% DESIGN FEATURES

> Builds upon signal timing changes made in 2016. Adds protection for people turning left onto 3rd Ave NW, while maintaining signal efficiency by installing flashing yellow arrows.

> Provides space for bus pull outs.

> See diagram for estimated wait times and queue lengths during the busiest travel time (4pm-6pm)



RICHMOND BEACH ROAD RECHANNELIZATION

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

shorelinewa.gov/RBRechannelization

8th Ave NW Intersection Design

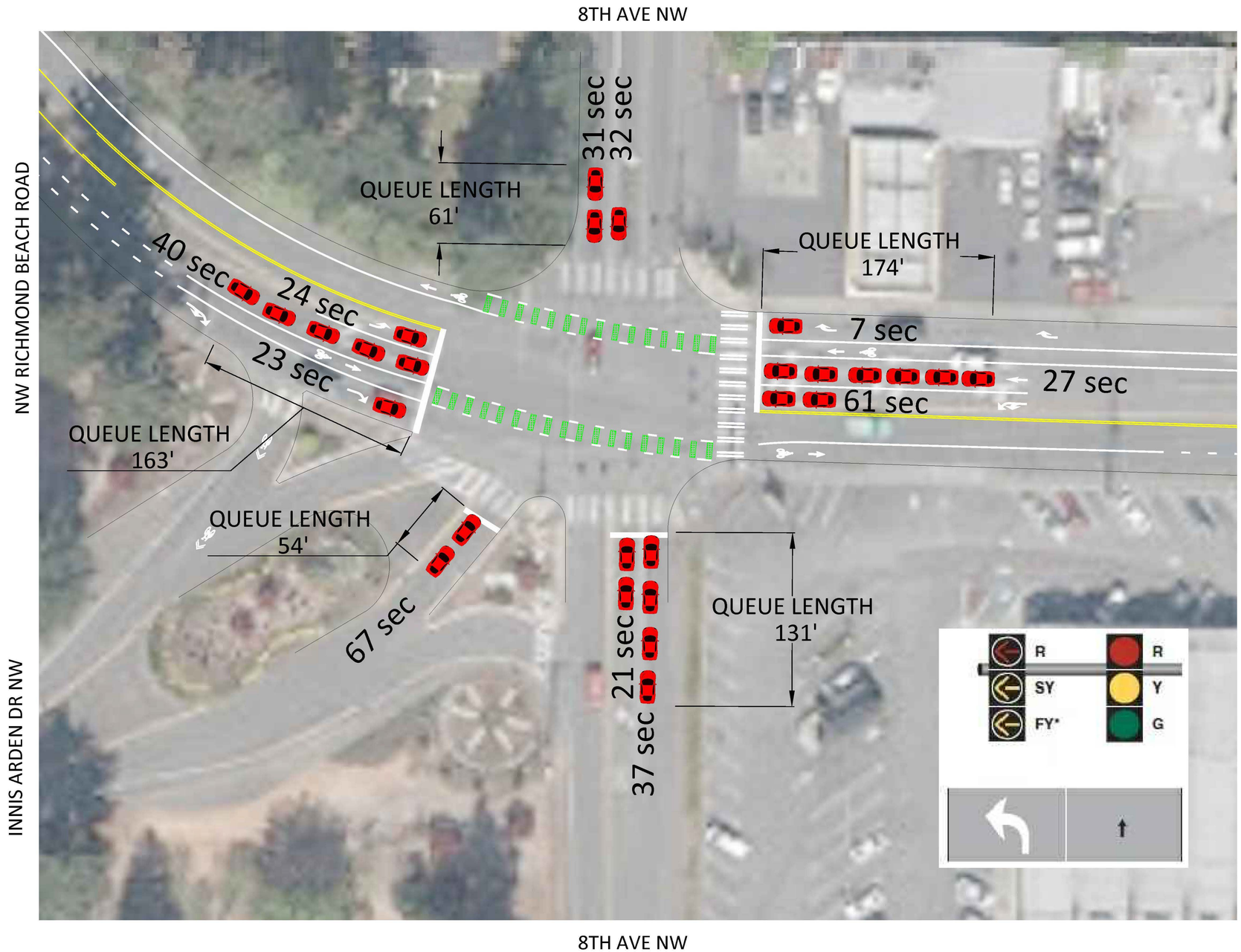
60% DESIGN FEATURES

> Increases intersection efficiency by installing Flashing Yellow Arrows for 8th Ave NW. This allows northbound and southbound 8th Ave NW to go at the same time.

> Minimizes conflicts between right turning cars and bikes continuing on Richmond Beach Road.

> Identifies the bike lane through the intersection.

> See diagram for estimated wait times and queue lengths during the busiest travel time (4pm-6pm)



RICHMOND BEACH ROAD RECHANNELIZATION

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shorelinewa.gov/RBRechannelization

15th Ave NW Intersection Design

60% DESIGN FEATURES

> Provides space for bus turn out.

> Prevents fast right turns from Richmond Beach to 15th Ave NW.

> Provides dedicated left turn lanes to 15th Ave NW.

> Makes it easier for people to take a left turn from southbound 15th Ave NW to eastbound Richmond Beach Road.

> Requires new flashing beacon treatment located on the Stop Signs.

> See diagram for estimated wait times during the busiest travel time (4pm-6pm).

Flashing Beacon Options

LED Beacon above Stop Sign

LED Stop Sign

RICHMOND BEACH ROAD RECHANNELIZATION

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

shorelinewa.gov/RBRechannelization

20th Ave NW Intersection Design

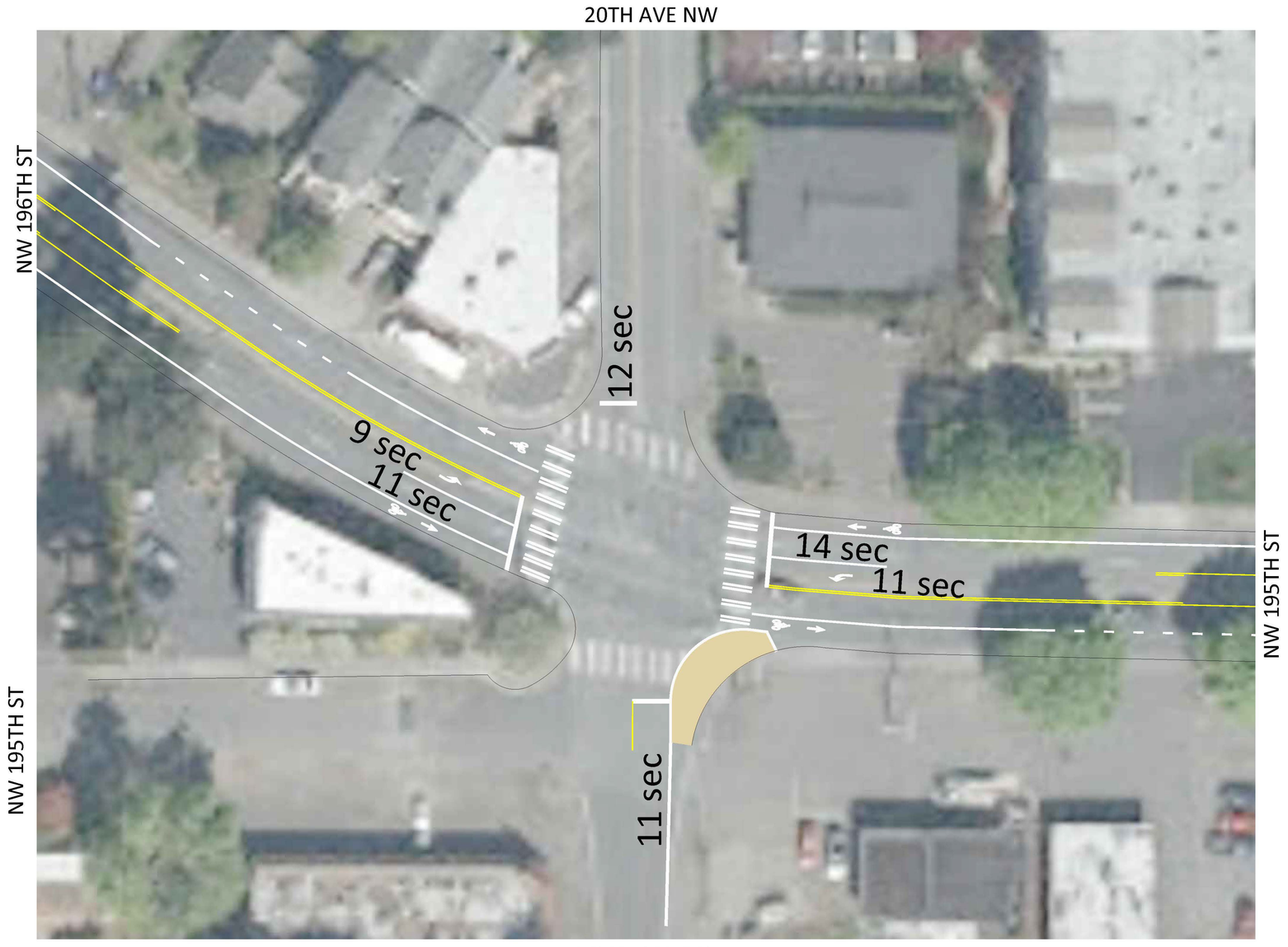
60% DESIGN FEATURES

> Provides space for bus turn out while maintaining existing bus stop locations

> Utilizes wider bike lane space to provide painted "curb bulb" on the southeast corner which shortens the pedestrian crossings and slows down turning vehicles.

> Provides dedicated left turn lanes to 20th Ave NW.

> See diagram for estimated wait times during the busiest travel time (4pm-6pm)



RICHMOND BEACH ROAD RECHANNELIZATION

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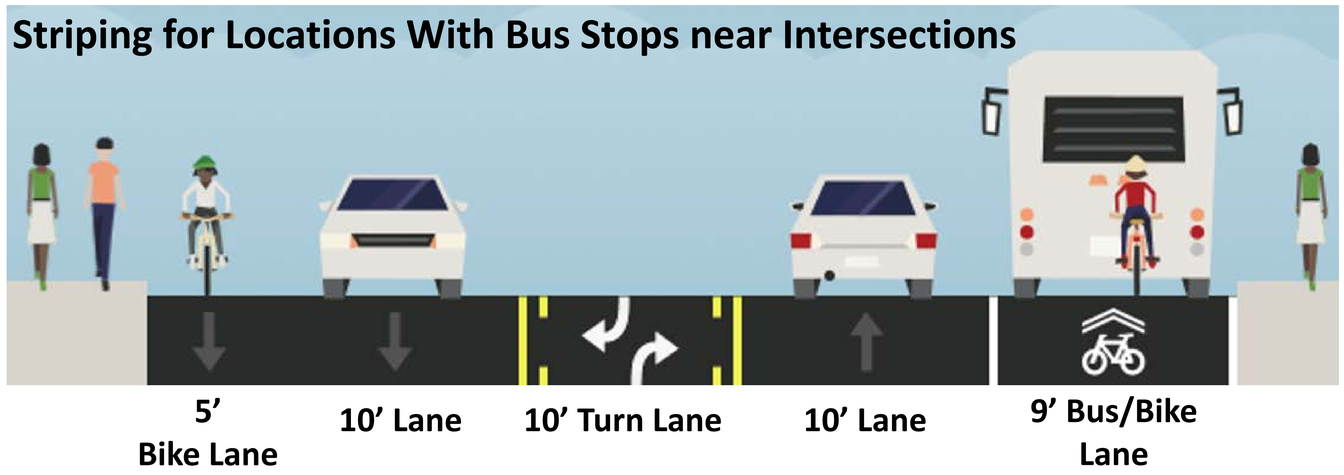
shorelinewa.gov/RBRechannelization

BUSES AND OTHER BLOCKAGES

It is legal to go around stopped, blocking vehicles. This is how every 2 or 3 lane roadway functions, some with traffic volumes higher than this corridor.

Buses at Bus Stops

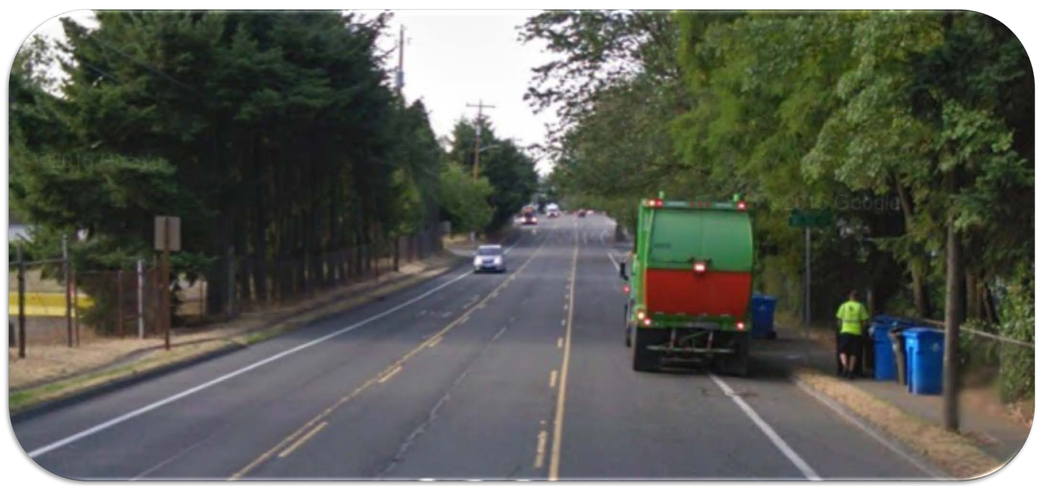


- Bus stop locations have been evaluated based on ridership. We are working with Metro to remove or relocate some stops. – *See the Roll Plots for Changes to Bus Stops*
- When bus stops are near intersections with turn lanes, bus pullouts will be provided (see diagram above)

Other Blockages

Shown below, is a garbage truck stopped on 15th Ave NE. Passing cars only have to utilize part of the center turn lane to go around – with plenty of ability to see potential conflicts.

The same would be true for other blocking vehicles



DO PEOPLE BIKE ON RICHMOND BEACH ROAD?

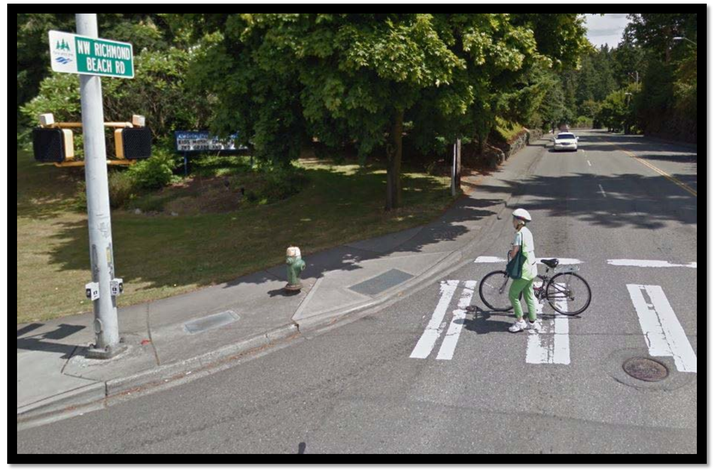
People are biking along Richmond Beach Road.

Bike collision history and traffic counts show that bicyclists are using this road, including the hill segment.

When more bike lanes are installed, more people will bike, and their bike rides become safer.
Source: https://nacto.org/2016/07/20/high-quality-bike-facilities-increase-ridership-make-biking-safer/

As more people use power assisted bikes, the corridor's topography is less of an issue.

Region wide, biking is up 7.8% since 2011. *Source: Washington State Bicycle and Pedestrian Documentation Project.*



<u>The primary goal of this rechannelization project is to improve safety.</u> The leftover width provides space for bicyclists and is consistent with the adopted Bike Master Plan

Vehicle vs. Bicyclist collisions account for nearly 12% of injury collisions Citywide.

INJURY COLLISION TYPES

The new configuration is expected to decrease the potential for head on collisions.

From 2010-2016 there were 315 Injury Collisions in the City of Shoreline.

There were 34 “Opposite Direction” Collisions.

- ✓ **0 occurred in a two-way center turn lane**
- ✓ 1 was head on. The remaining 33 were sideswipes, turn related, or other.

There were over **100 pedestrian and bicycle injury collisions in the same time period.**

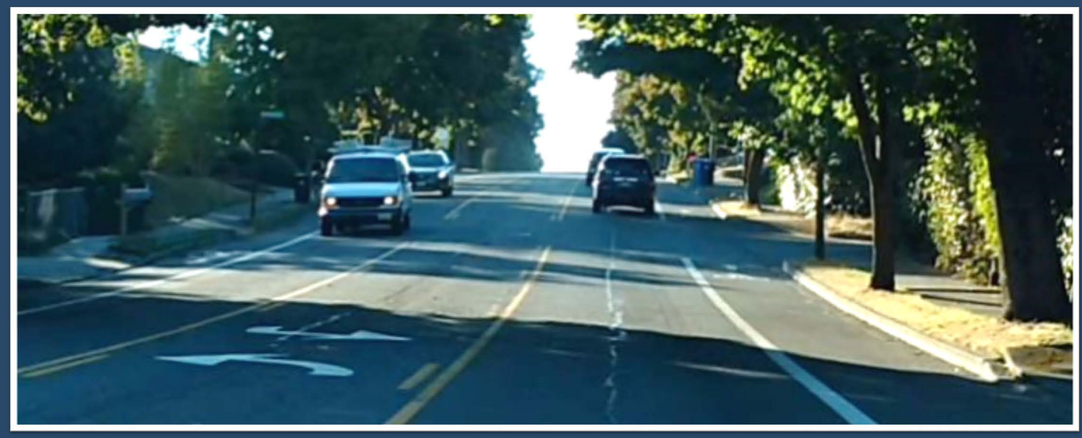
Rechannelization is shown to help 3 out of 4 of the top injury collision types

Type of Collision	Percent of Total
Vehicle – pedestrian	**20.6%**
Entering at angle	**18.1%**
Driver Hits fixed object	13.0%
Vehicle – bicyclist	**11.7%**

Photo of NW Richmond Beach Road

Existing Roadway: High volumes of opposing traffic navigating curves very close to each other. A small error has the potential to cause a high speed head on collision.

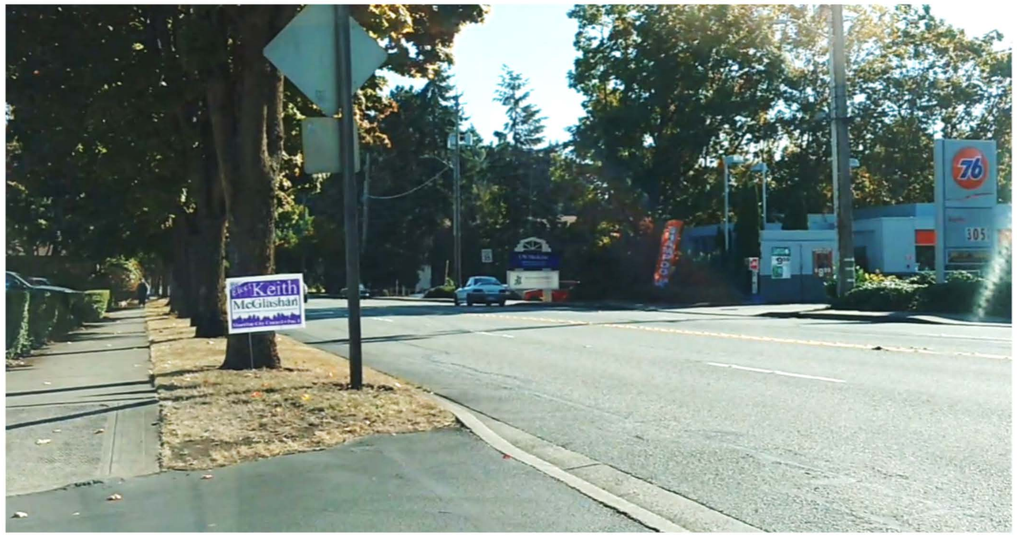
Photo of NE 155th St



Proposed Roadway: Two-way center turn lane is usually unoccupied. More separation between the main streams of traffic. Drivers slow as they enter the turn lane, making it easier to adapt to opposing traffic, and less catastrophic in the event of a collision.

DRIVER SAFETY BENEFITS – IMPROVED SIGHT LINES

This project improves people's ability to see oncoming vehicles by pushing the travel lane further out from the curb.



With the current configuration, you have to pull out into the vehicle lane to see oncoming cars. With the proposed configuration you can look for a gap in the bike lane, then pull forward to see the oncoming cars.

It is the responsibility of the vehicle entering the roadway to yield to the vehicles (including bicyclists) traveling on the main road.

To enter the road when you have limited visibility you may have to do a multistage stop where you:

1. Stop before pedestrian zone (sidewalk, crosswalk, shoulder). If no pedestrians are present, pull forward.
2. Stop before the bike lane. If no bikes are present, pull forward until you gain adequate views of cross traffic.
3. Select an appropriate gap and enter the roadway.

The photos to the left were taken at the QFC driveway. When the driver pulled into the road an additional 6 feet, they were better able to see on-coming traffic.

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

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)

- 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

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 and its undetermined future traffic impacts that will not occur for a 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 that would be necessary 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.

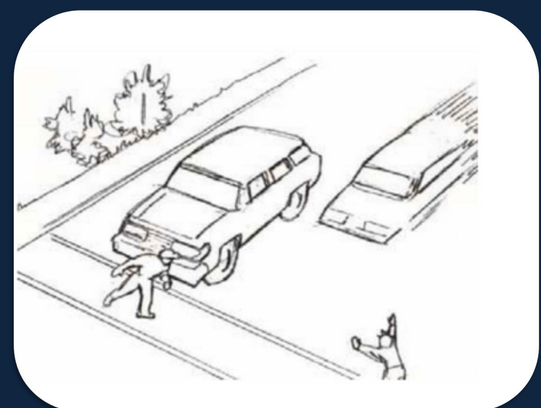
PEDESTRIAN & BICYCLIST SAFETY BENEFITS

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

(few are struck walking along the sidewalk).

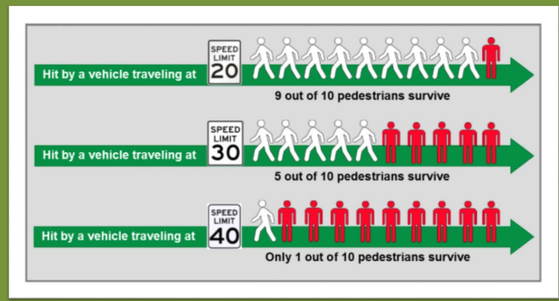
Where the center lane space is not needed or turns are low, “pedestrian refuge” space can be striped for safer crossing. →

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



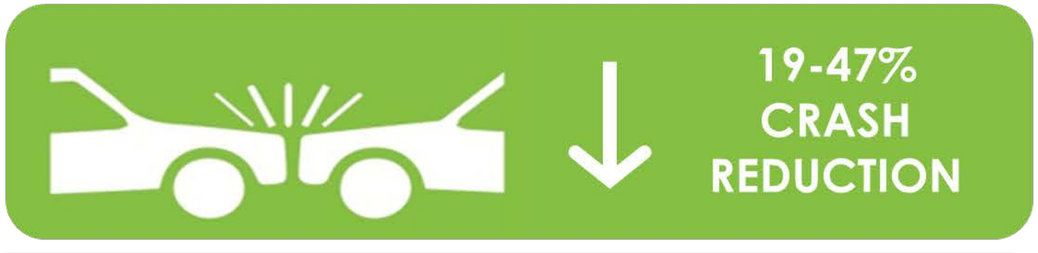
VS.

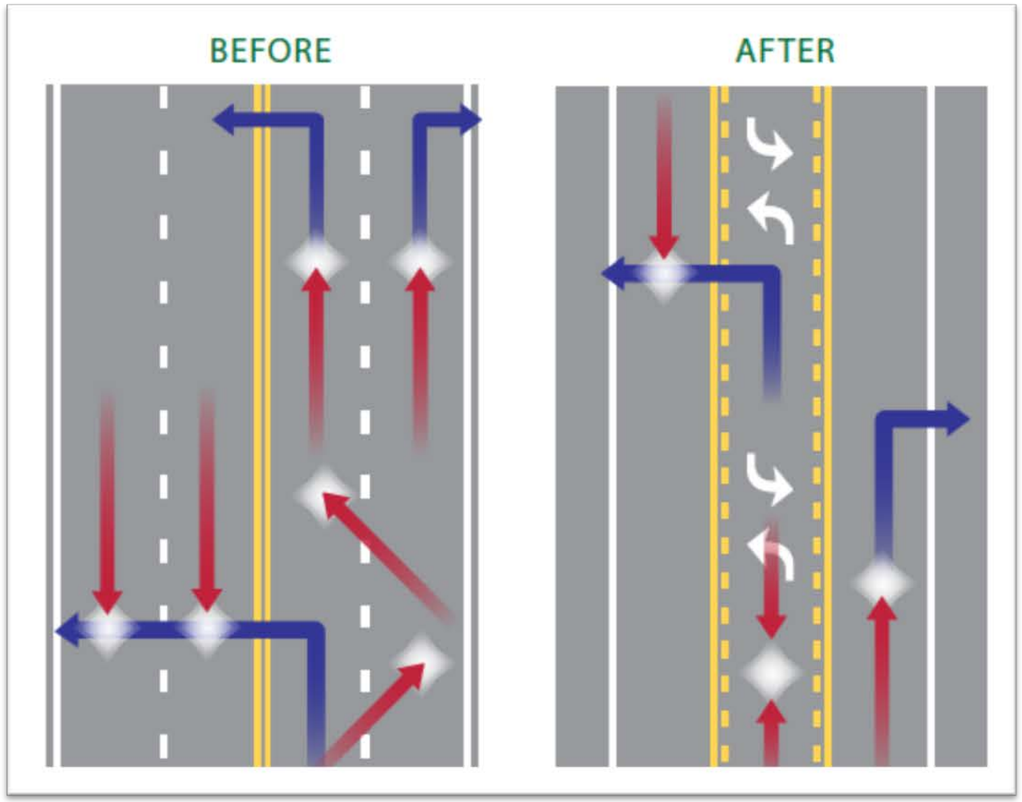
← Bike lane markings provide the expectation for drivers to encounter bicyclists, improving their awareness and **attentiveness to bicyclists** while driving.

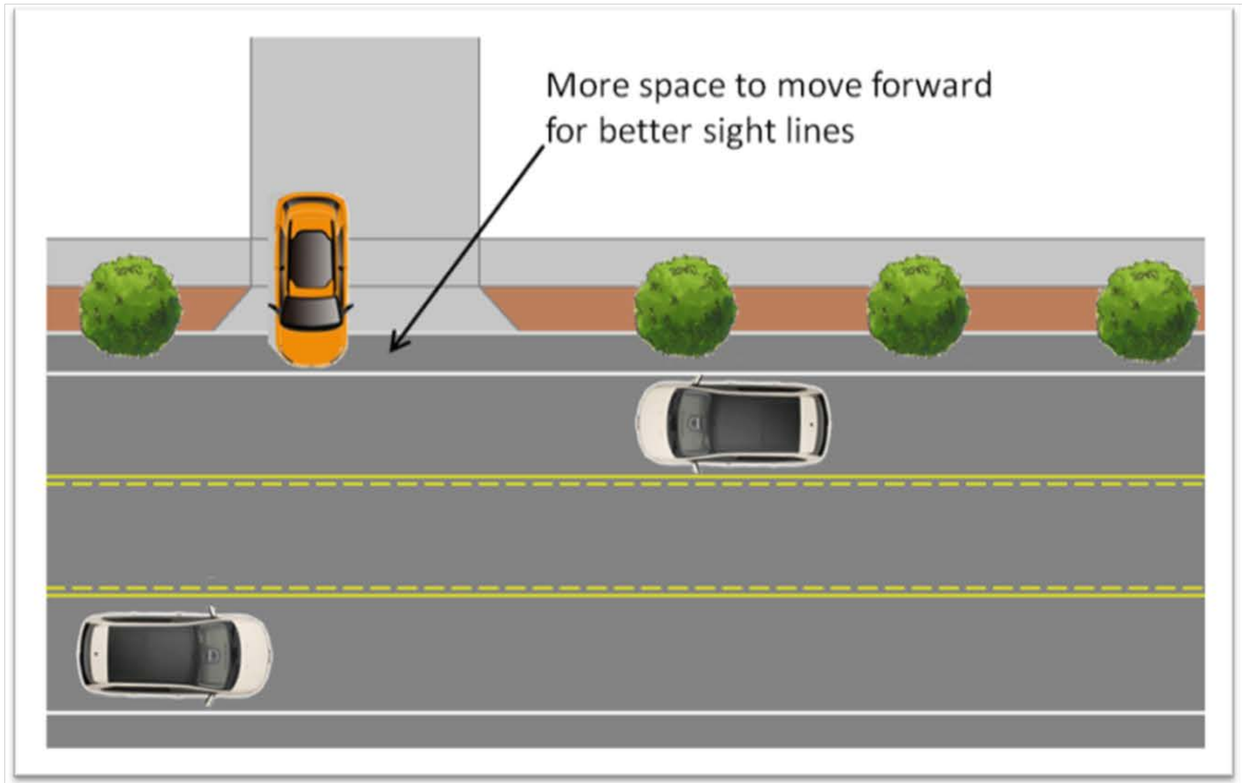
Less lanes to cross = safer reduced pedestrian exposure

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**

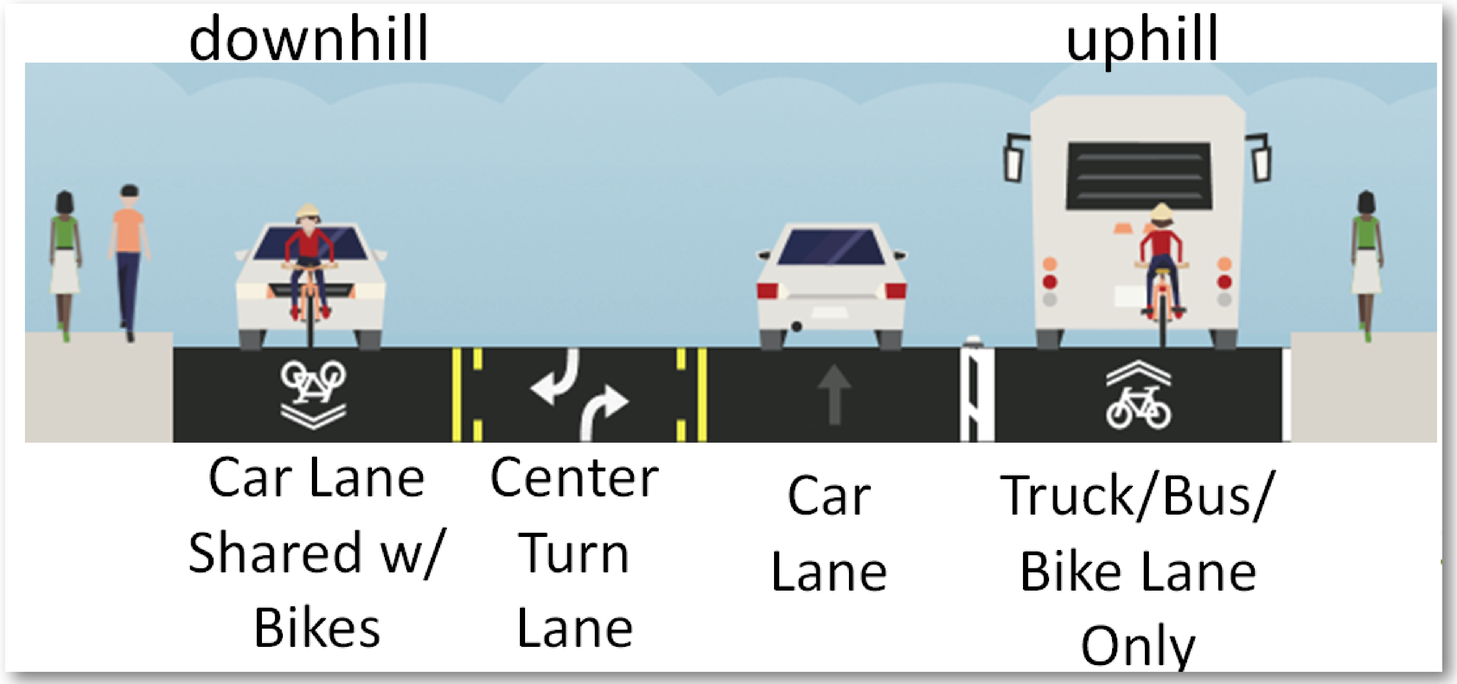






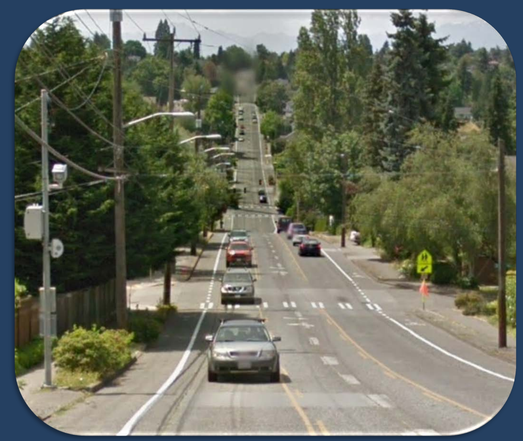
SLOW MOVING VEHICLES

- 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.



BICYCLE SYSTEM PLAN (2011)