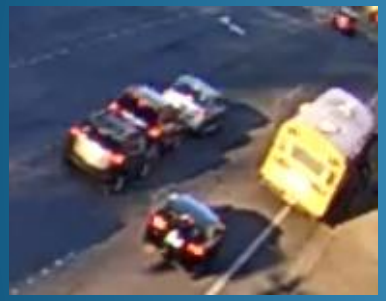
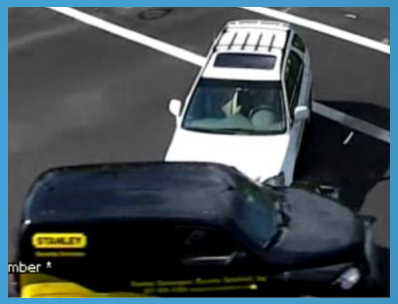
The Use of ITS Technologies in Collision Response & Investigation

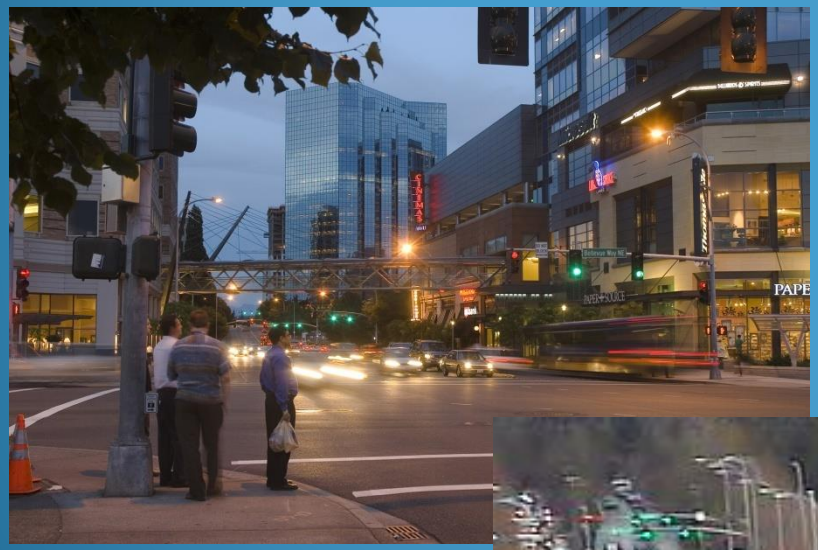





ITS Washington
Raid Tirhi, PE
December 14, 2022

Traffic Operations Primary Goal

Moving all transportation modes in the most efficient yet safe manner



Collision Causes

Roadway Design Issues

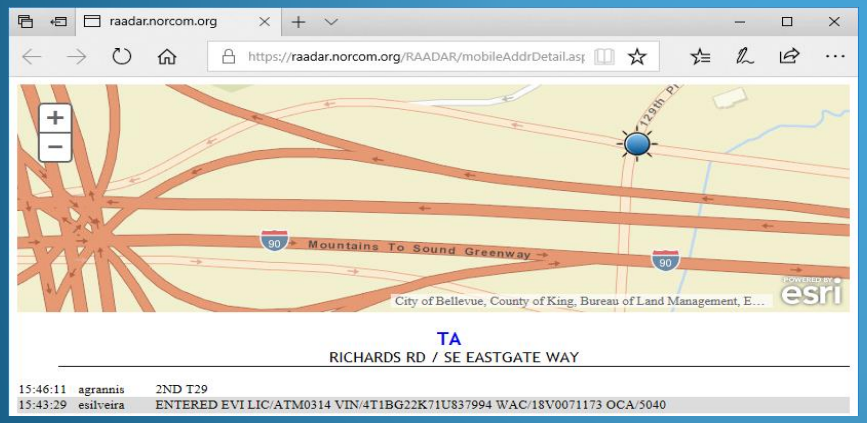
Vehicle Malfunction

~~**94% Erroneous Driver Behavior**~~ **>** **99% Erroneous Human Behavior**

NORCOM Notifications

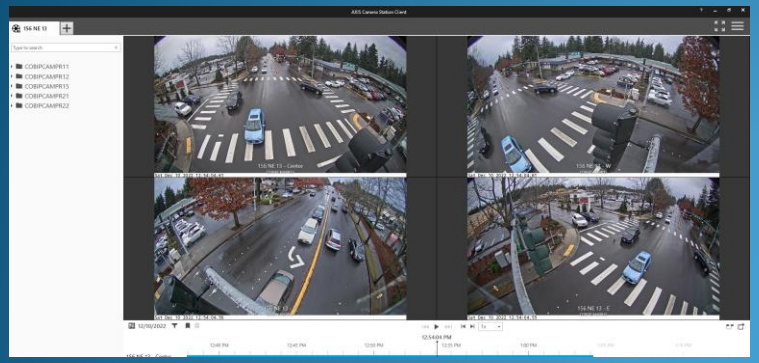
-----Original Message-----
From: paging@norcom.org [mailto:paging@norcom.org]
Sent: Wednesday, May 16, 2018 2:12 PM
To: Tirhi, Raid <RTirhi@bellevuewa.gov>
Subject: BLVUTraffic Group Page

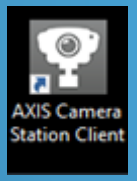
Priority Call for BLVPD in Progress: CFS #290 TA at RICHARDS RD / SE EASTGATE WAY
http://bit.ly/2KrpvGb



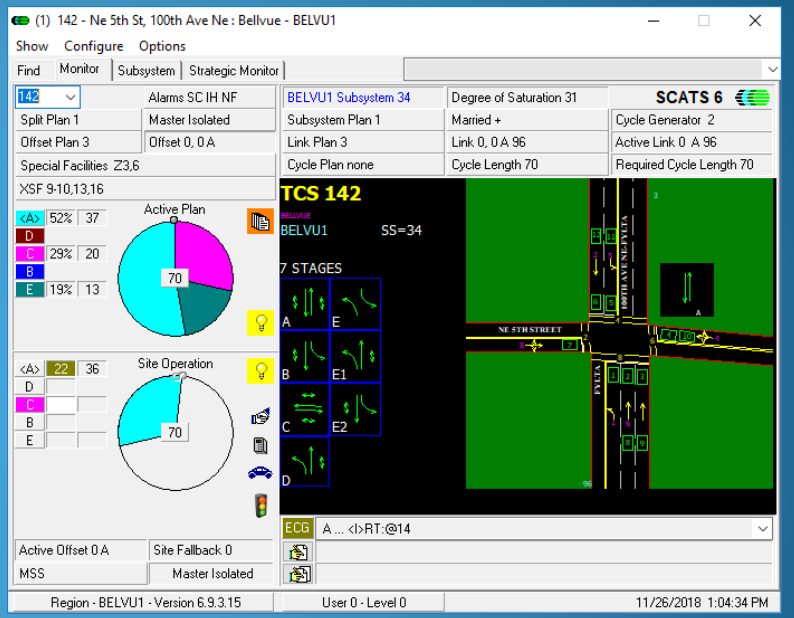
ITS Technologies

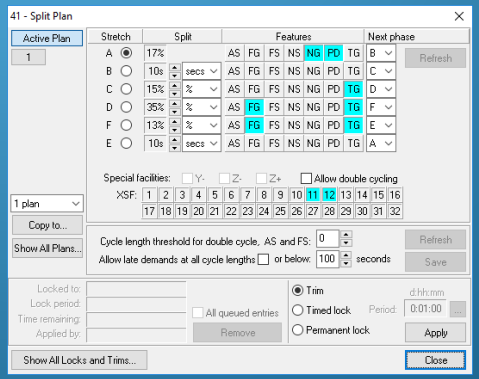
Camera Systems

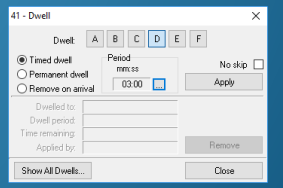




Adaptive Traffic Signal System- SCATS



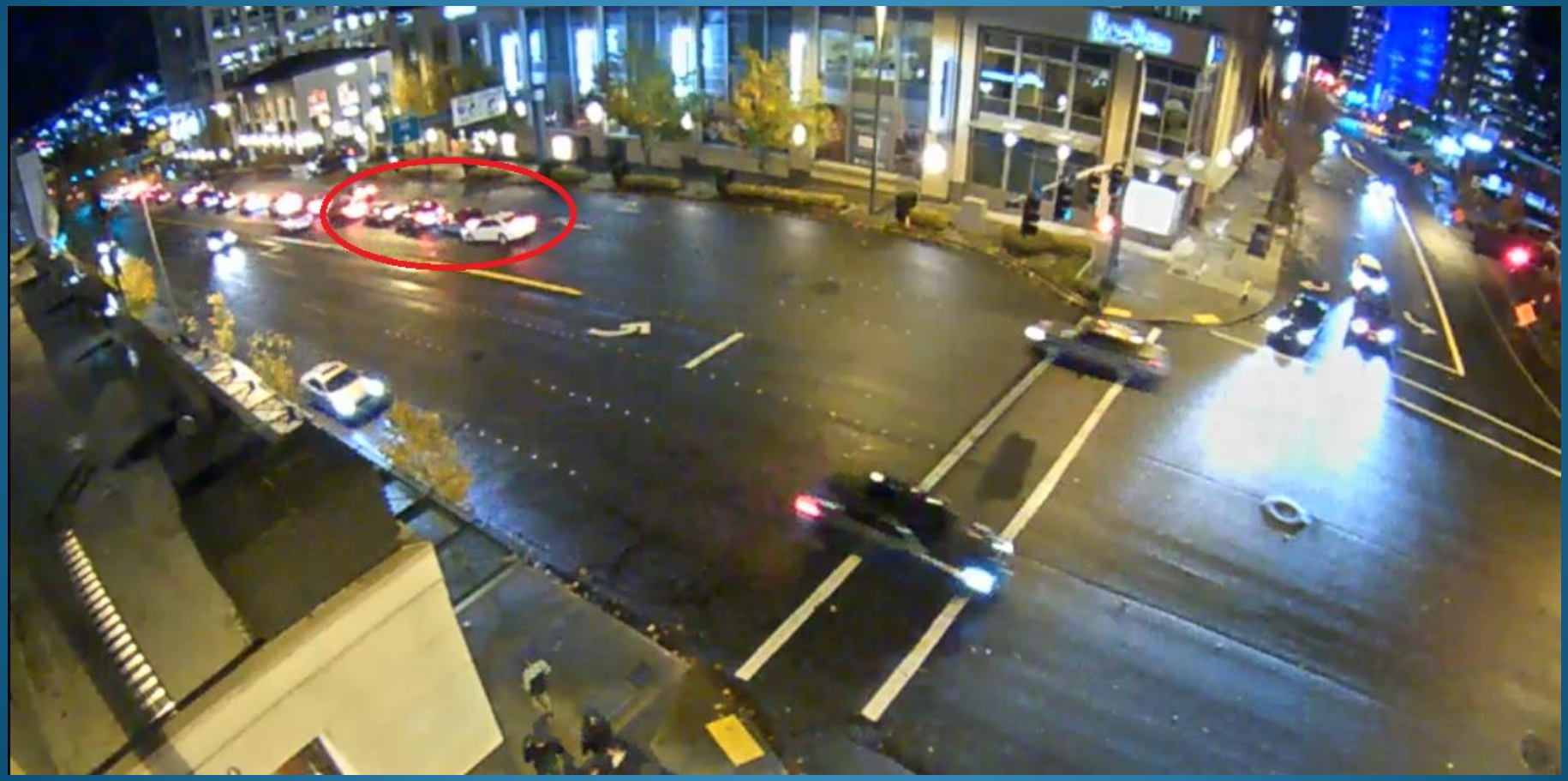




Signal phasing/timing tweaks

- Public Information

Long term signal timing tweaks

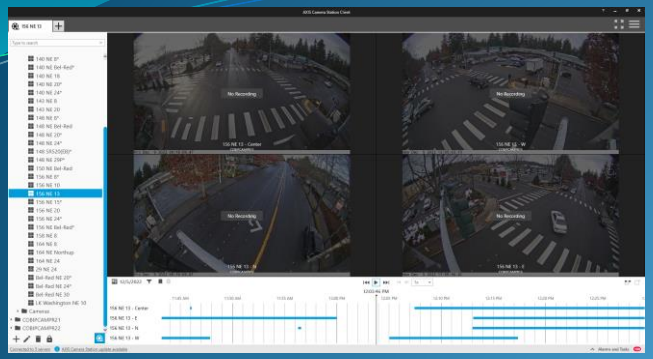


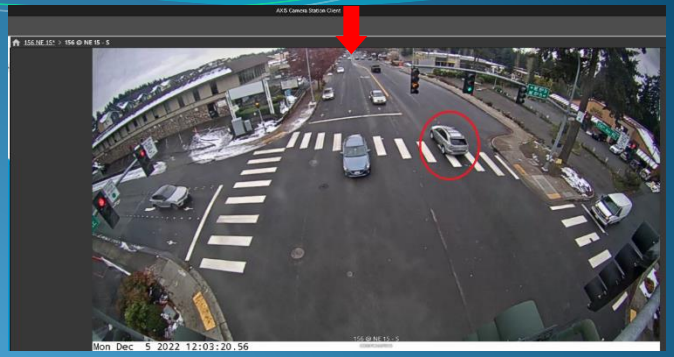
Engineering solutions

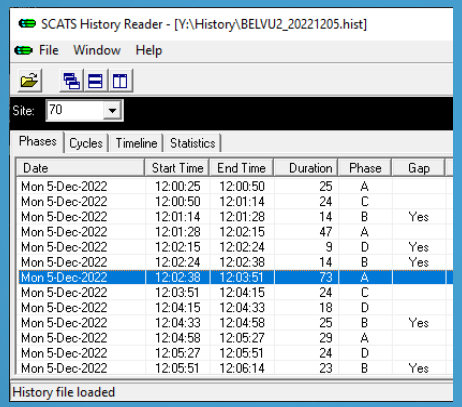
Ped Minus Flashing Yellow Arrow with a Ped Jump

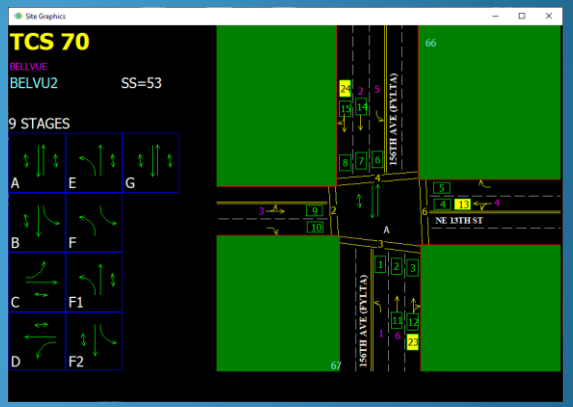

Fri Dec 10 2021 12:37:15.23

Collision Investigations



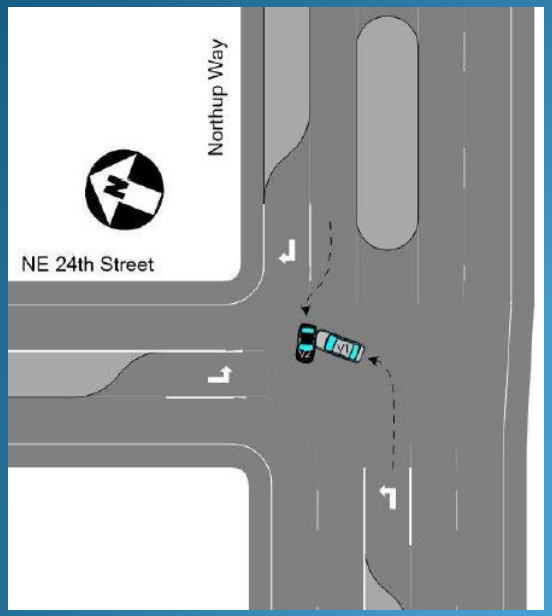






- Camera at subject intersection lost com
- Upstream camera barely shows the collision but no signal displays
- Collision happened at about 12:03:47pm.
- From the traffic signal history file, the collision happened during the westbound signal phase Stage “A” which includes a Flashing yellow Arrow (FYA).
- The time stamps of both systems are based on an atomic clock and are synched within a second.
- SB left vehicle did not yield on a FYA.

FYA- Collision Investigation



D1 stated that they were EB on Northup Way at the intersection of NE 24th Street. D1 stated that the sun was low in the sky making it difficult to see. D1 stated that he put his head out the window to check for WB traffic. D1 stated that he made a left turn on a flashing yellow light and collided with V2 in the intersection. D1 stated that he did not see V2 until after the collision. It should be noted on video I was able to zoom in on D2 and confirmed that he did look out the driver window attempting to clear the intersection prior to entering it.

D2 stated that they were WB on Northup Way nearing the intersection of NE 24th Street. D2 stated that V1 turned into the path of V2. D2 attempted to avoid the collision but was unable too. D2 stated that V1 collided with the driver side door of V2 causing V2 to spin.

A traffic signal control box belonging to the City of Bellevue was also impacted. City of Bellevue signals responded to the scene to evaluate the equipment.

I reviewed Bellevue Transportation camera footage from the intersection. The footage showed V1 in the left turn lane. D1 looked out their open window after stopping. V1 proceeded into the intersection and struck V2. V2 is observed swerving to avoid the collision but was unable too. A copy of the footage was booked into Quetel digital evidence.

V1 Damage: V1 had damage (ripped/bent metal) to the front driver side fender/hood/bumper. No airbags were deployed. the vehicle was towed by Crossroads Towing

V2 Damage: V2 had damage to the driver side door (bent metal). The vehicle was towed by Crossroads Towing

Based on statements and vehicle damage D1 caused the collision by failing to obey the traffic control device. I issued D1 an infraction for RCW 46.61.050.

Collision Investigation: FYA ➡ Run Red

SCATS History Reader - [Z:\History\BELVU1_20221011.hist]

File Window Help

Site: 118

Phases | Cycles | Timeline | Statistics

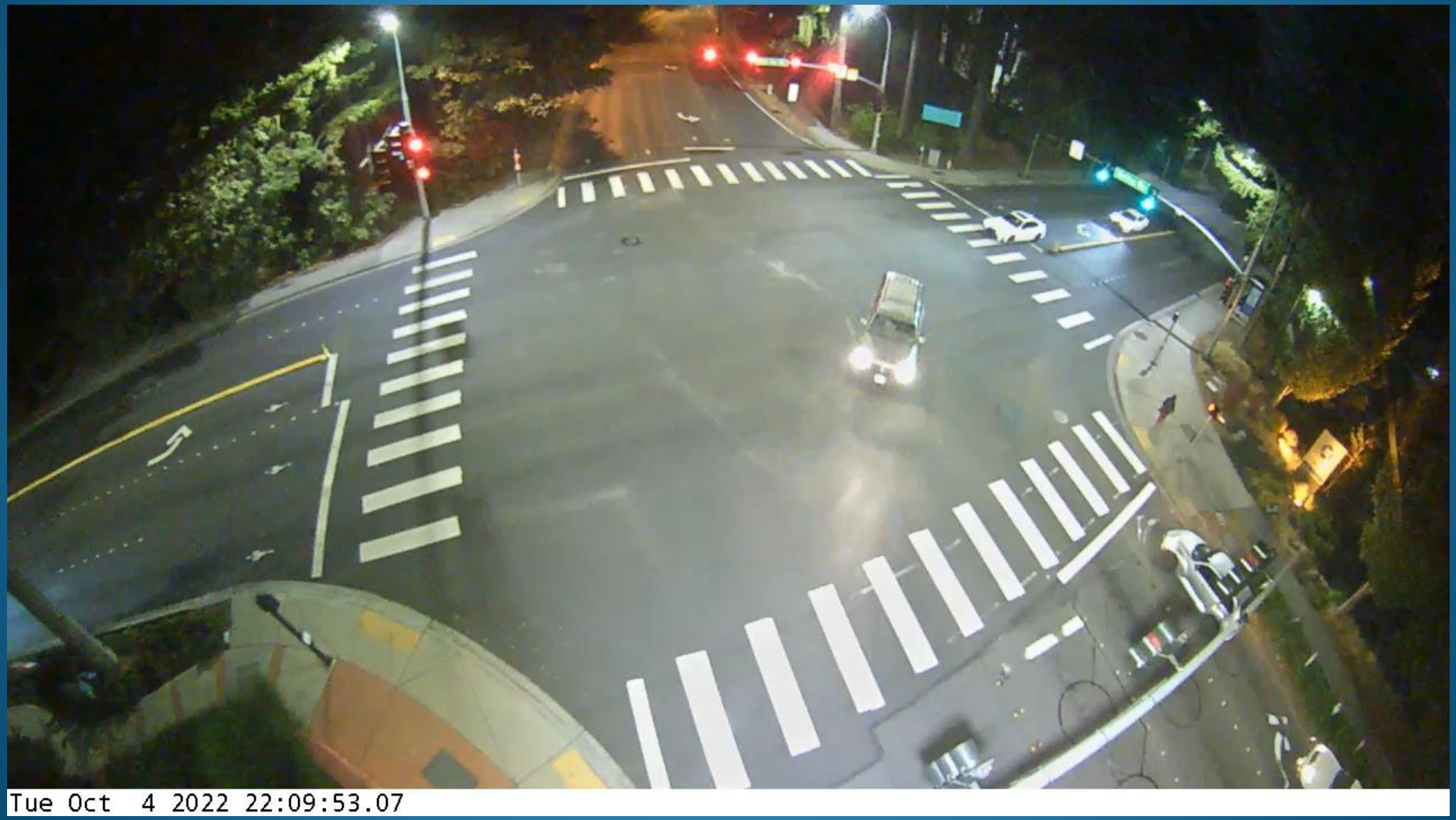
Date	Start Time	End Time	Duration	Phase	Gap
Tue 11-Oct-2022	08:47:13	08:47:48	35	A	Yes
Tue 11-Oct-2022	08:47:48	08:47:58	10	B	
Tue 11-Oct-2022	08:47:58	08:48:41	43	A	Yes
Tue 11-Oct-2022	08:48:41	08:48:51	10	C	Yes
Tue 11-Oct-2022	08:48:51	08:49:13	22	A	Yes
Tue 11-Oct-2022	08:49:13	08:49:24	11	B	
Tue 11-Oct-2022	08:49:24	08:49:47	23	A	Yes
Tue 11-Oct-2022	08:49:47	08:49:58	11	B	
Tue 11-Oct-2022	08:49:58	08:50:28	30	A	Yes

History file loaded


Tue Oct 11 2022 08:48:40.76

FYA- Follow & Clearance

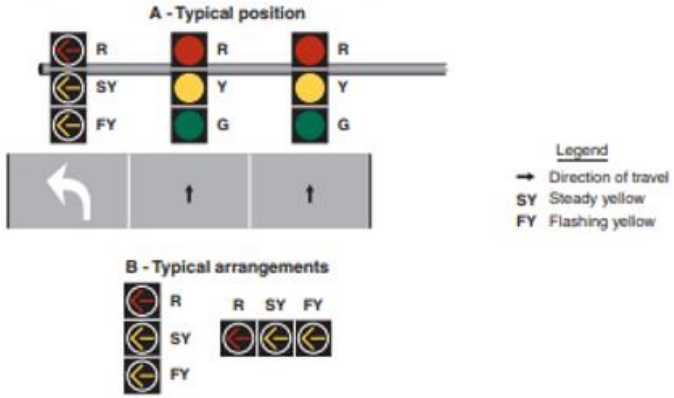
FYA- Follow



FYA Collisions
8-year footage history

All Collisions	2,417
T-Bone Collisions	321 (13%)
FYA Collisions	197 (8%)
FYA Contributing Factors	
Follow	Clearance
30%	22%

Figure 4D-7. Typical Position and Arrangements of Separate Signal Faces with Flashing Yellow Arrow for Permissive Only Mode Left Turns

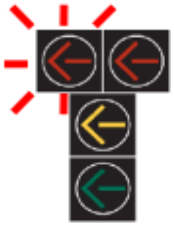


B. During the permissive left-turn movement, a flashing left-turn YELLOW ARROW signal indication shall be displayed.
C. A steady left-turn YELLOW ARROW signal indication shall be displayed following the flashing left-turn YELLOW ARROW signal indication.
D. It shall be permitted to display a flashing left-turn YELLOW ARROW signal indication for a permissive left-turn movement while the signal faces for the adjacent through movement display steady CIRCULAR RED signal indications and the opposing left-turn signal faces display left-turn GREEN ARROW signal indications for a protected left-turn movement.
E. During steady mode (stop-and-go) operation, the signal section that displays the steady left-turn YELLOW ARROW signal indication during change intervals shall not be used to display the flashing left-turn YELLOW ARROW signal indication for permissive left turns.
F. During flashing mode operation (see Section 4D.30), the display of a flashing left-turn YELLOW ARROW signal indication shall be only from the signal section that displays a steady left-turn YELLOW ARROW signal indication during steady mode (stop-and-go) operation.
G. If the permissive only mode is not the only left-turn mode used for the approach, the signal face shall be the same separate left-turn signal face with a flashing YELLOW ARROW signal indication that is used for the protected/permissive mode (see Section 4D.20) except that the left-turn GREEN ARROW signal indication shall not be displayed when operating in the permissive only mode.

https://deldot.gov/projects/traffic-signal/pdfs/DelDOT%20Left-Turn%20Phasing%20-%202021%20Update.pdf

Special Protected-Permitted (Flashing Red Arrow)

Protected-permitted operation with a flashing red arrow has been implemented at many signalized intersections in Delaware. Normally a left-turn green arrow is displayed first ("protected" part of phase), followed by a yellow arrow, then a circular red indication or red arrow, and finally a flashing red arrow ("permitted" part of phase). Legally, drivers are required to completely stop and then proceed during the flashing red arrow interval when there is an adequate gap in opposing traffic. This type of left-turn operation is generally between standard protected-permitted and protected-only phasing with respect to both efficiency and crash risk.



Coal Creek Pkwy

Coal Creek Pkwy

Education

Bellevue Transpo @BvueTrans · 7h

Crashes usually increase at the start of rainier weather. A few reminders to keep you and other road users safe if you are driving:
- Slow down during rainy conditions
- Check your tire tread to see if you need to replace your tires – A worn tire won't provide as much traction!

1 1

Bellevue Transpo @BvueTrans · 7h

- Check your windshield wipers
- Keep your headlights clean
- Make sure your vehicle's defrost works

Did you know: Oil from vehicles accumulates on the road during the summer, making streets extra slippery this time of year!

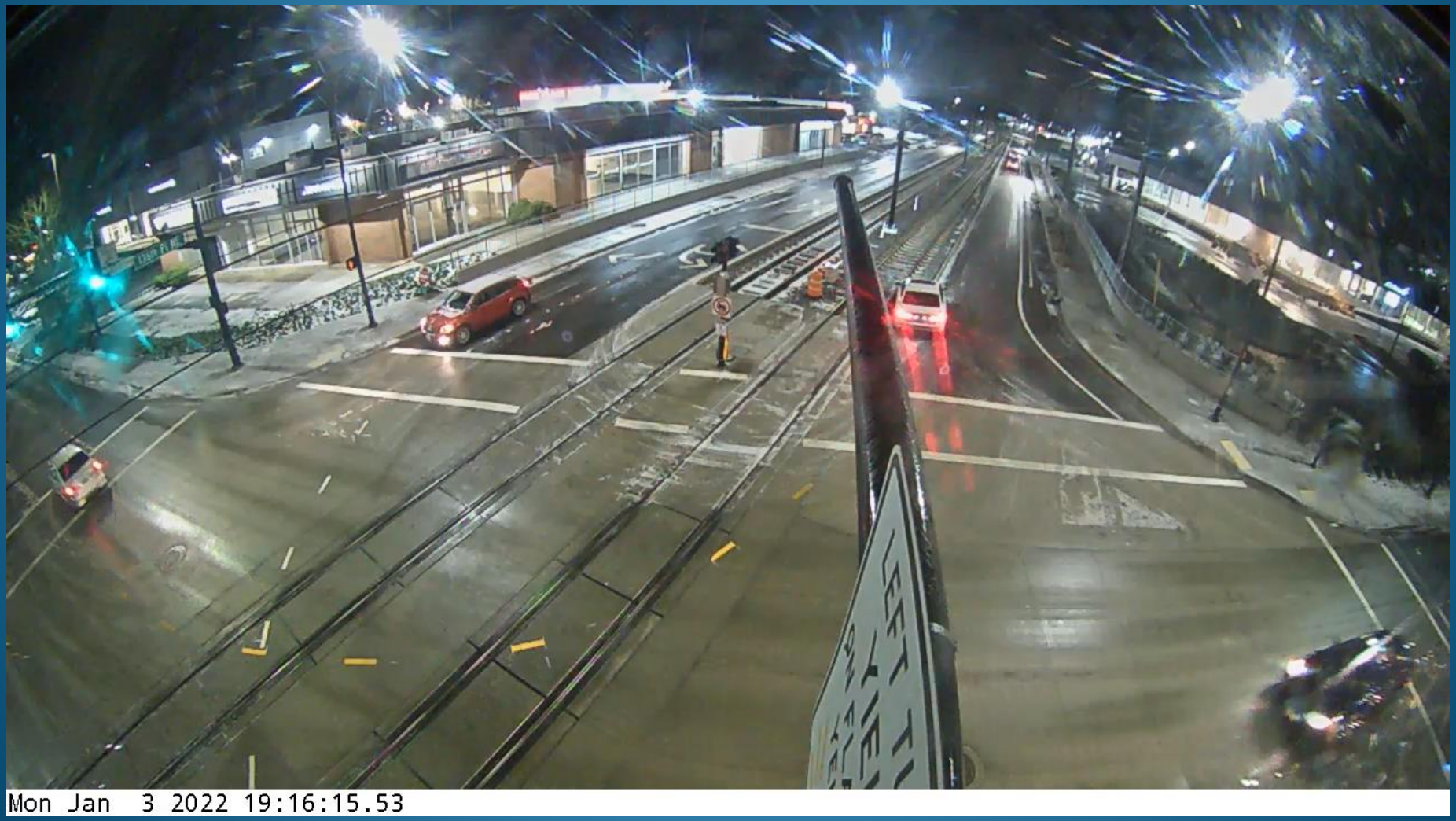
1 1

Bellevue Transpo @BvueTrans · 7h

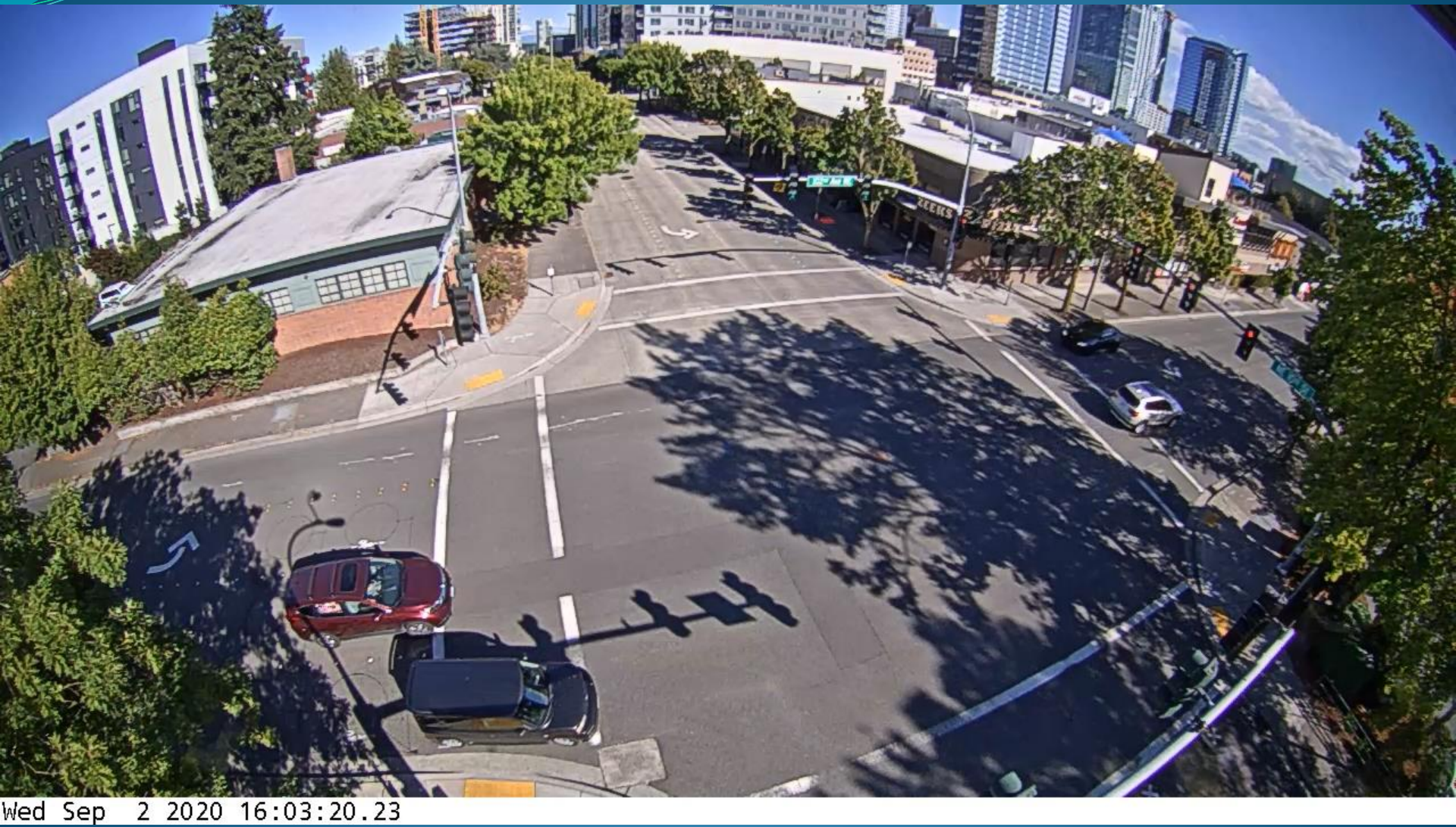
These images from our traffic cameras are examples of drivers losing control on Bellevue streets. Please slow down and be extra cautious!

4 3

Being Proactive

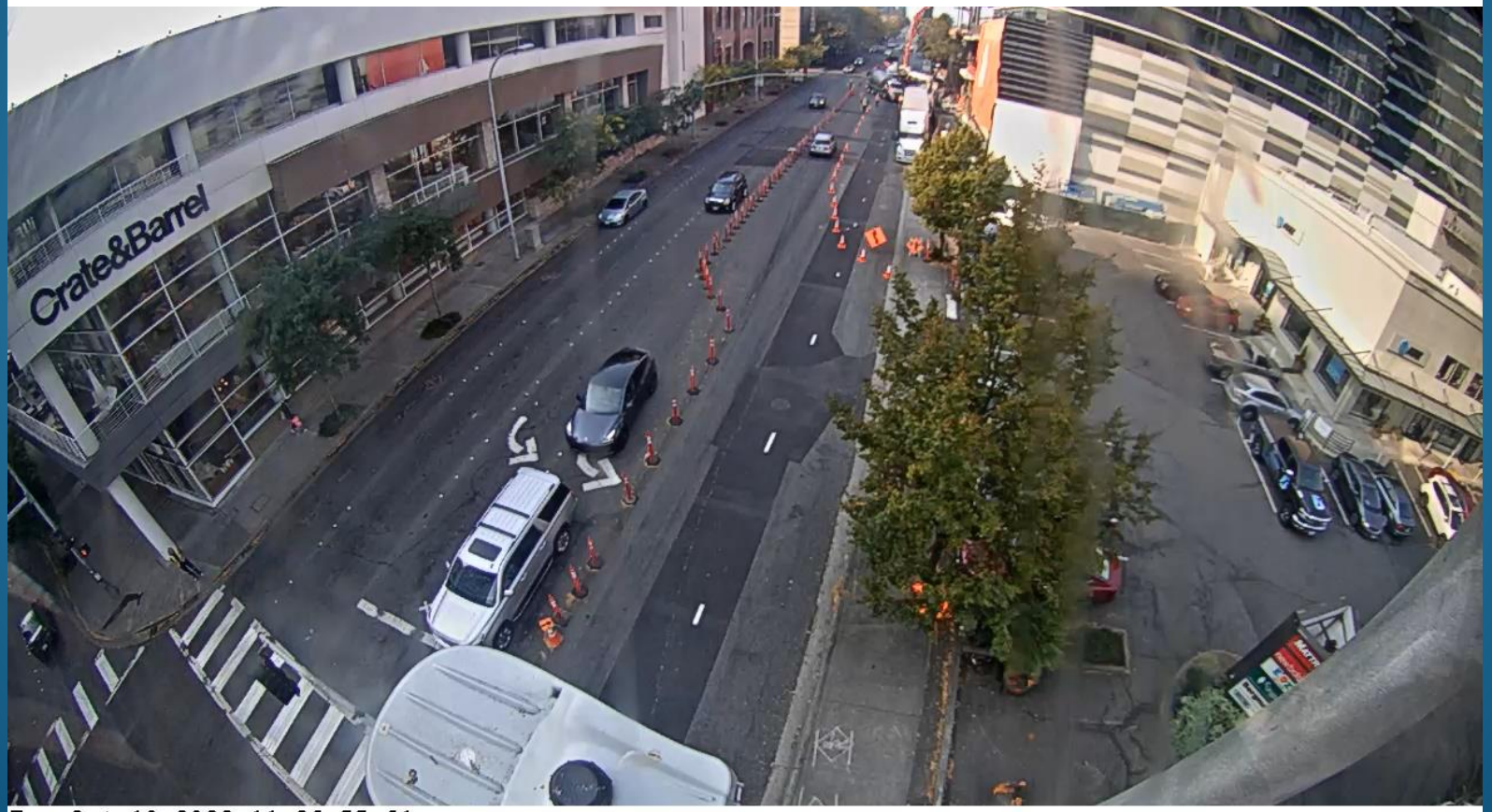


Green next lane- Distraction



The Future of Connected & Autonomous Vehicles

D1 was determined to be the cause of the collision and will receive a notice of infraction in the mail for negligent driving 2nd degree. (Tesla driver assistance features are not fully automated and require an attentive driver which D1 decided not to be).



U.S. DOT SBIR Fiscal Year 2022

Edge Server-based AI Application for Dilemma Zone and Traffic Conflict Events Detection

December 2022

AIWaysion

U.S. Department of Transportation Volpe Center

Thank You

Presented By
Raid Tirhi, Senior ITS Engineer

ITS-Washington Meeting
December 14, 2022