Algorithms, AI and Signal Timing

FRISCO LEE ENGINEERING

TexITE Fall 2025

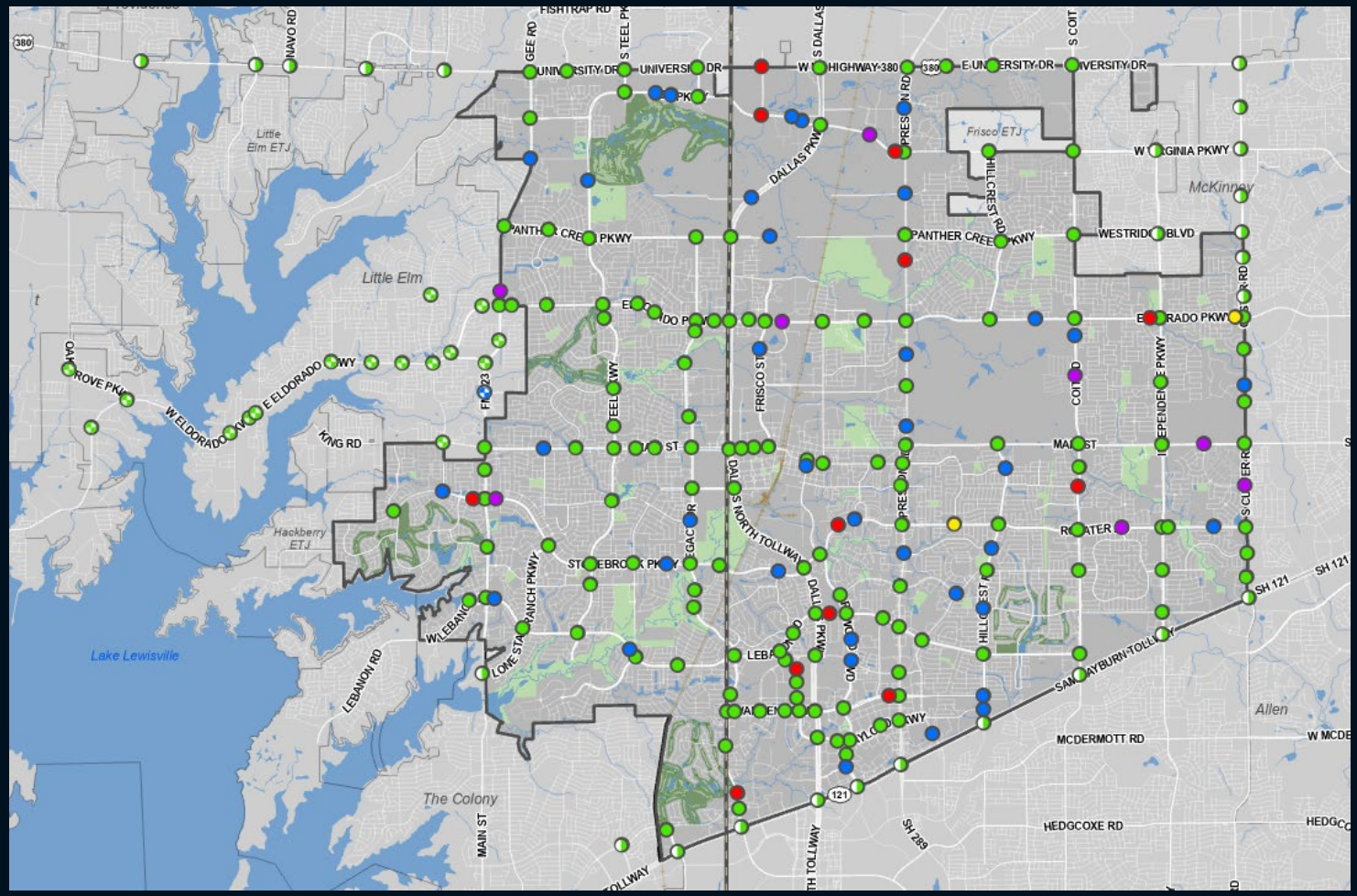
Kirk Houser, P.E.

Mike Wobken, P.E., PTOE

September 25, 2025

Frisco Signal System

- 2025 Pop Est – 242,000
  - Fast Growth
  - Best Place to Live
  - Sports City
- Operate 174+ traffic signals
- Controllers
  - 89% ATC – Cubic/Trafficware
- Cameras – PTZ & Fixed
  - 800+



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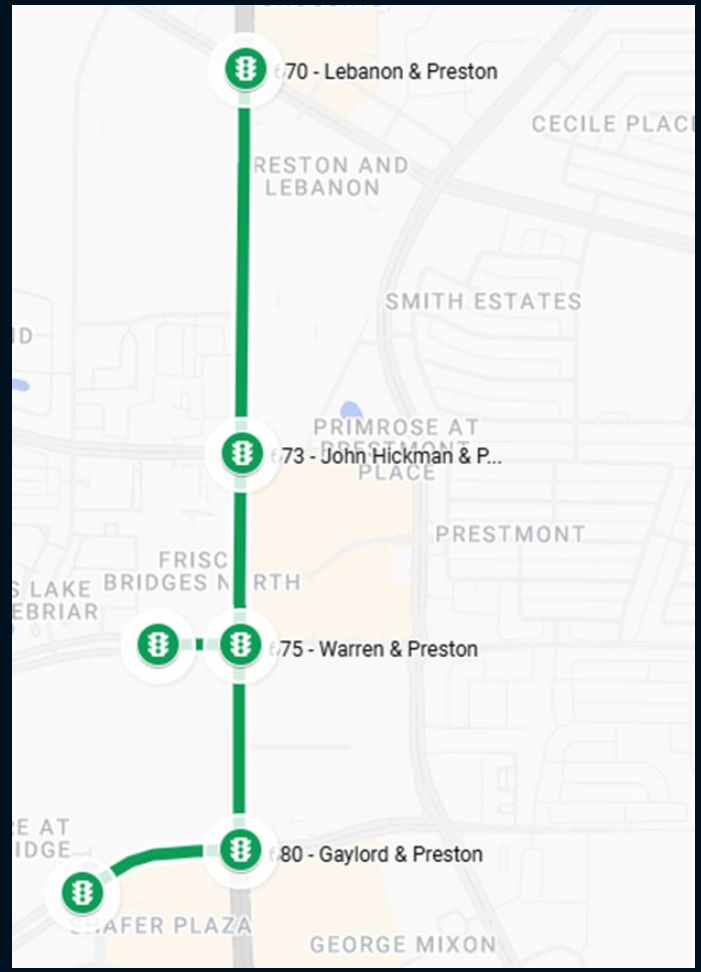
Preston Road Corridor

- 6 intersection study area
  - 4 on Preston
  - 2 on side streets
- Adjacent to Stonebriar Mall, Ikea, & large amount of retail & dining
- Running SynchroGreen since 2020



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Purpose of Study

Timing project with evaluation of 4 alternatives:

"Actual" Intelligence

- Neotraditional - tweak existing timings using Performance measures – no new counts

"Artificial" Intelligence - algorithms

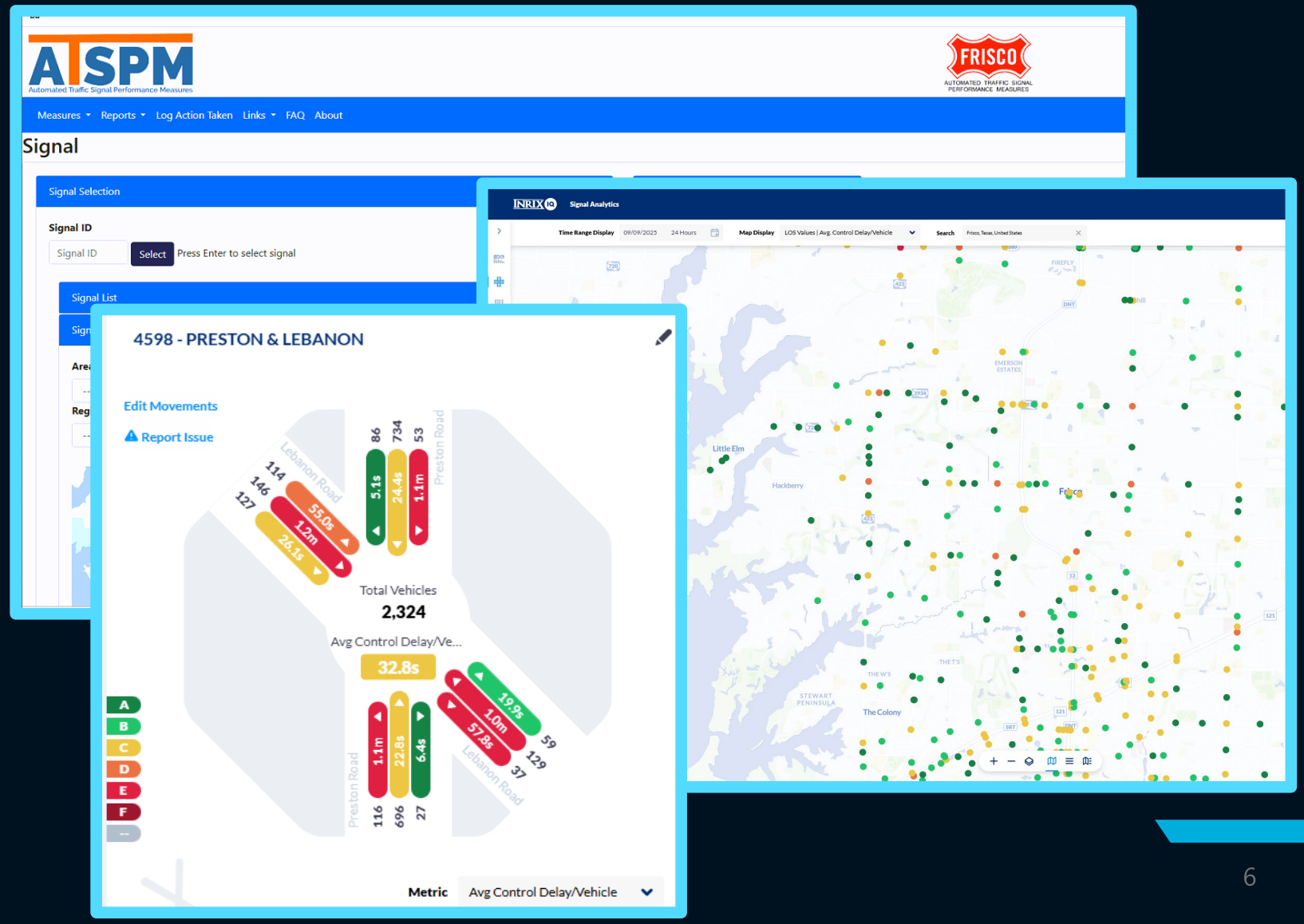
- SynchroGreen – full adaptive
- SynchroGreen – splits only mode
- ITC City Pilot – video analytics

Project Goals

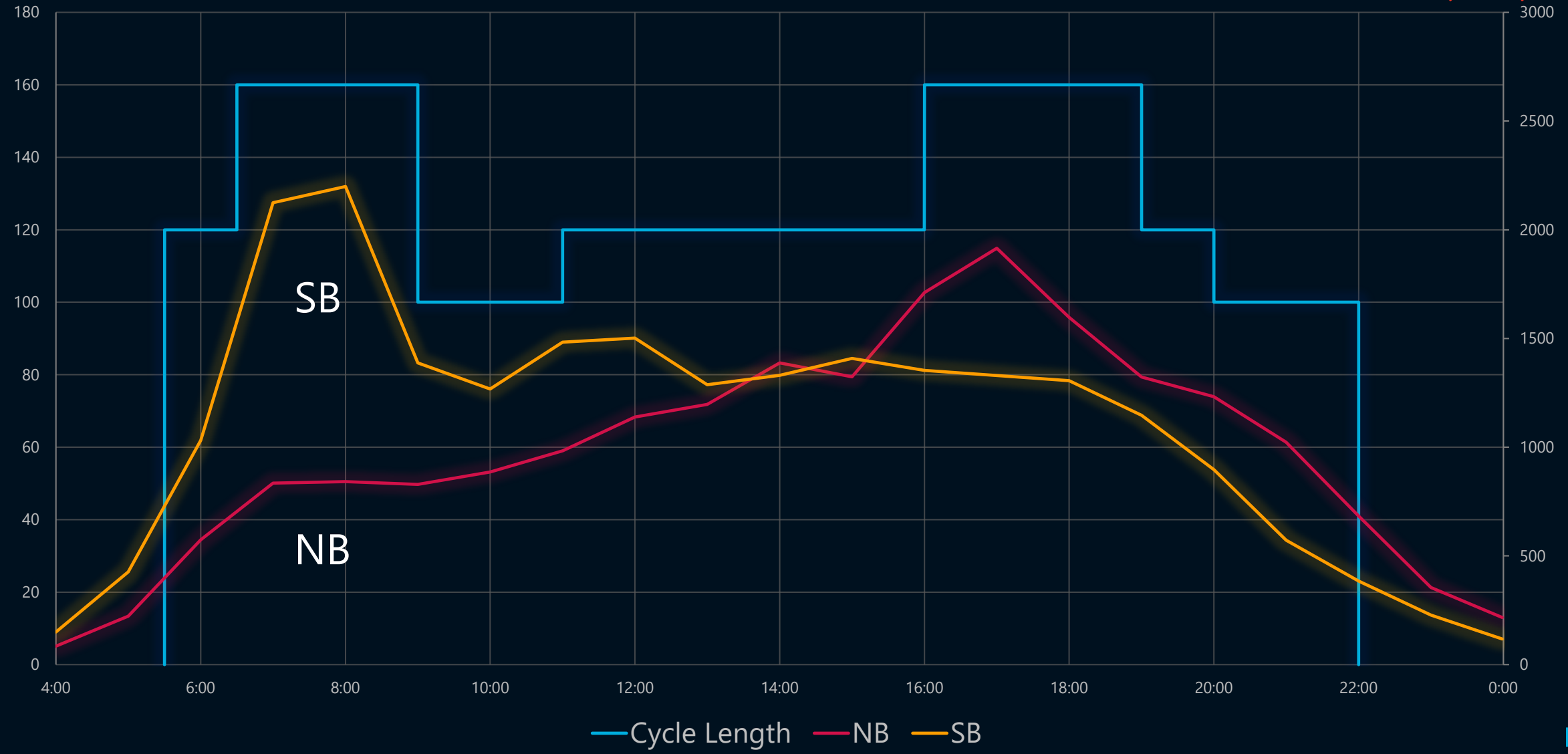
- What is the best strategy for this type of corridor?
- Can algorithm-based methods help minor movements without unduly harming progression?
- Are the advantages of frequent adaptive timing changes worth the downside of extra transitions?

Study Data Sources

- 1 PTZ and 4 fixed detection cameras per intersection
- Advanced Traffic Signal Performance Measures (ATSPM)
- Inrix Signal Analytics
  - Funded by NCTCOG
- Inrix Roadway Analytics
  - Funded by TxDOT



Frisco Time of Day Plan and Volume



Study Pre-stages

Develop Measures of Effectiveness (MOE) Toolbox

Report Name	Source	
	ATSPM	Inrix
Approach Volume	●	●
Turning Movement Count	●	●
Approach Delay/ Control Delay	●	●
Arrivals on Green	●	●
Split Failure	●	
Purdue Coordination Diagram	●	
Corridor Travel Times		●

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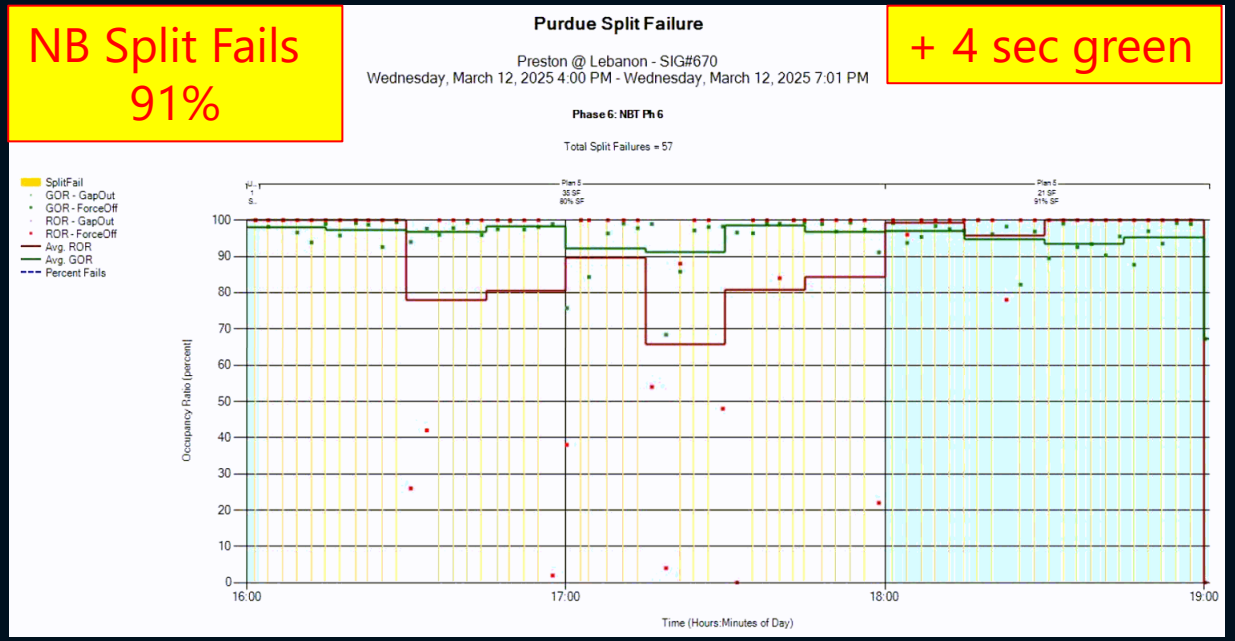
Study Pre-stages

Neotraditional

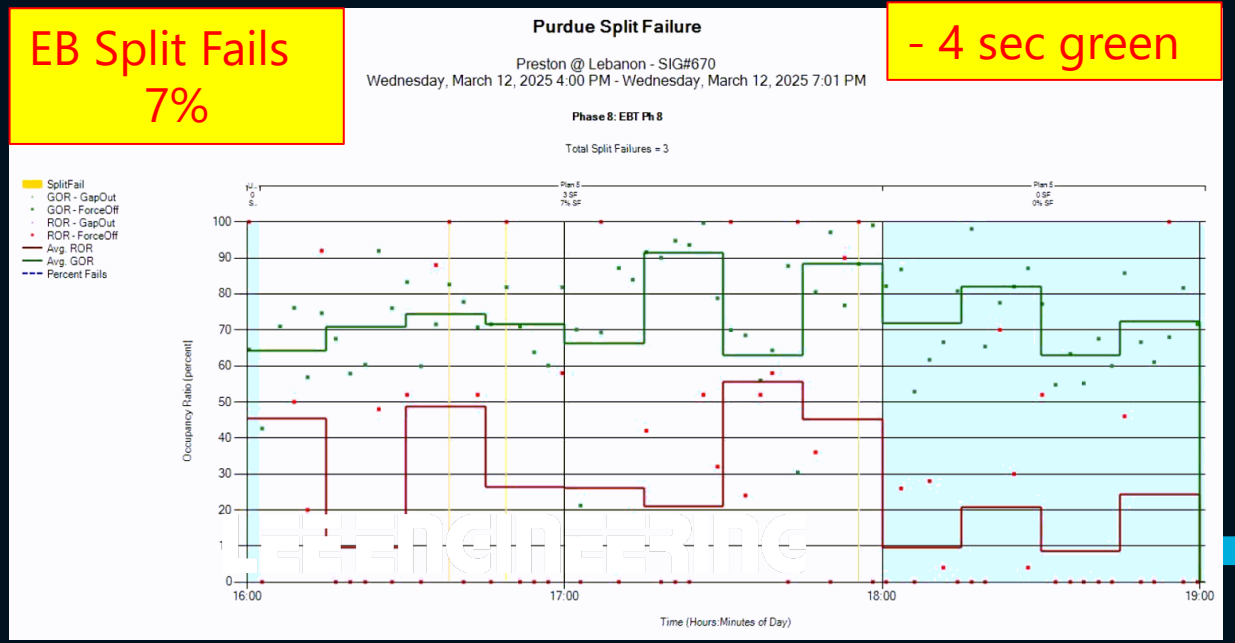
- SynchroGreen turned off
- No new counts
- Used camera observations, ATSPM, and Inrix Signal Analytics to fine-tune existing plans
  - Split Failures
  - Arrivals on Green

NB Split Fails 91%



+ 4 sec green

EB Split Fails 7%



- 4 sec green

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Study Pre-stages

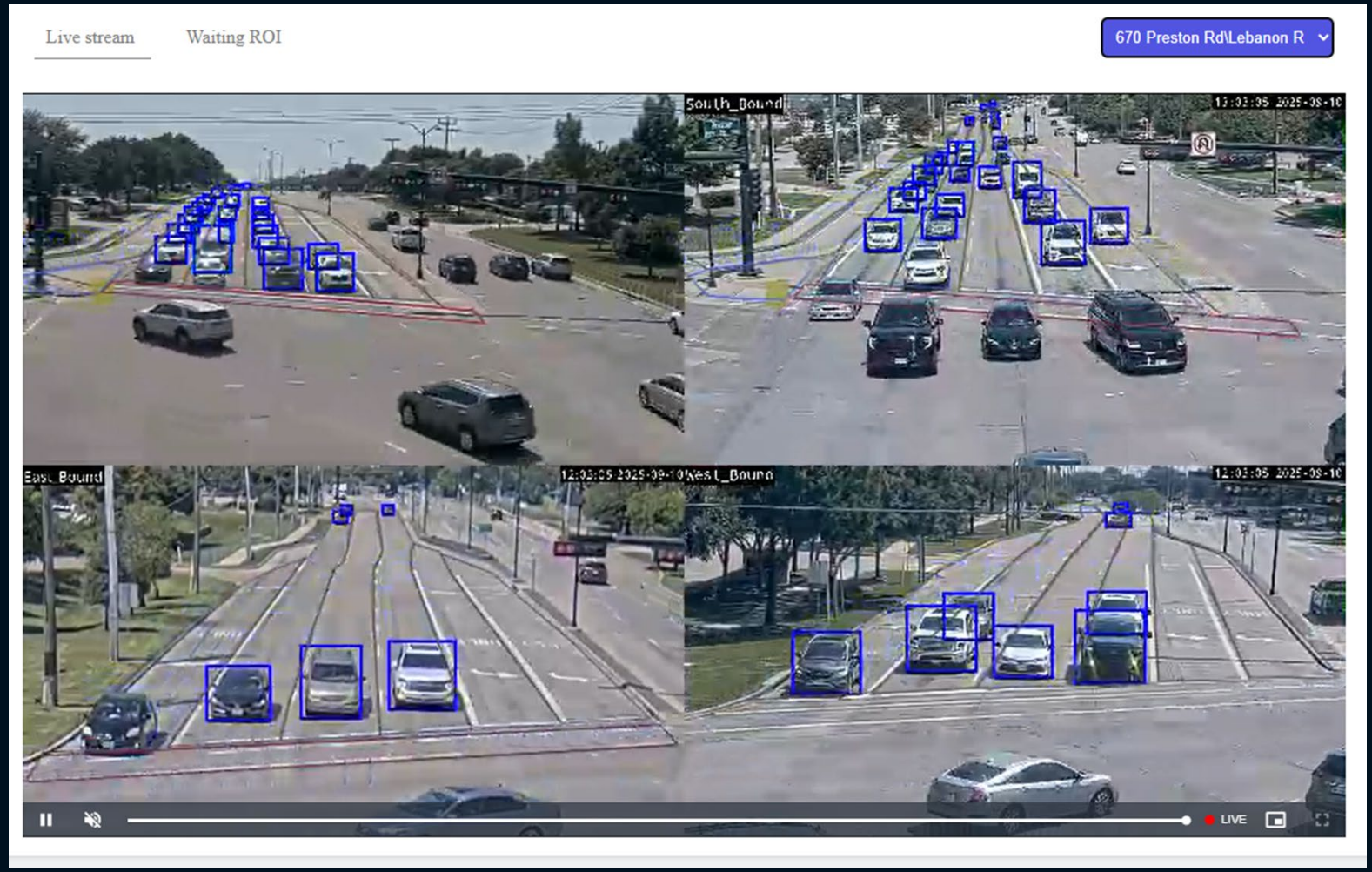
SynchroGreen

- Full adaptive
  - No setup needed
  - Existing operation
- Test splits only mode
  - Tricky to set up – would coord fail at plan changes and go back to backup timings. This took careful attention to “lag” settings
  - Determined this mode intended for isolated signals

Study Pre-stages

ITC City

- Video Algorithm looks at queues and a surrogate for split failure to tweak timings
- Creates digital twin based on months of data to generate suggested plans



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itc

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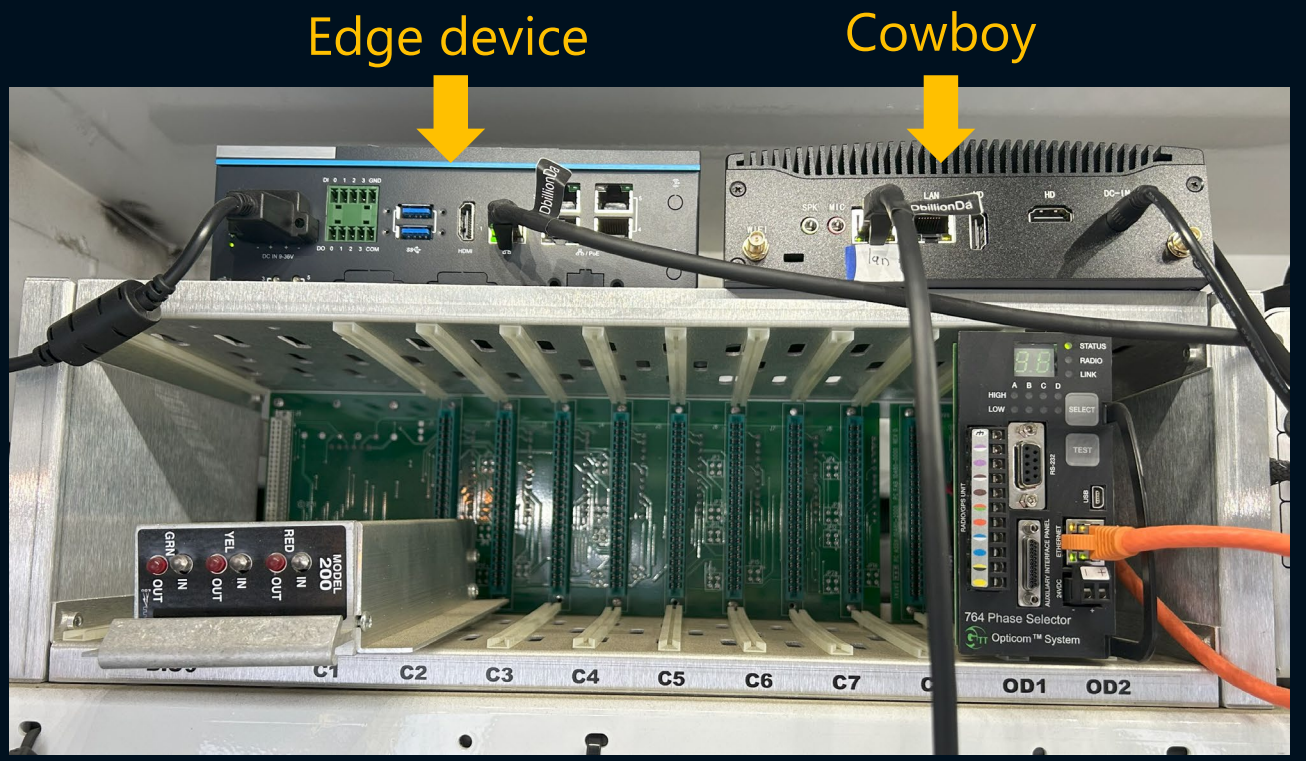
Study Pre-stages

ITC City

Equipment required:

- Uses existing Hi-rez cameras
- 1 edge device per cabinet
- 1 “Cowboy” control unit at one location



Study Pre-stages

ITC City

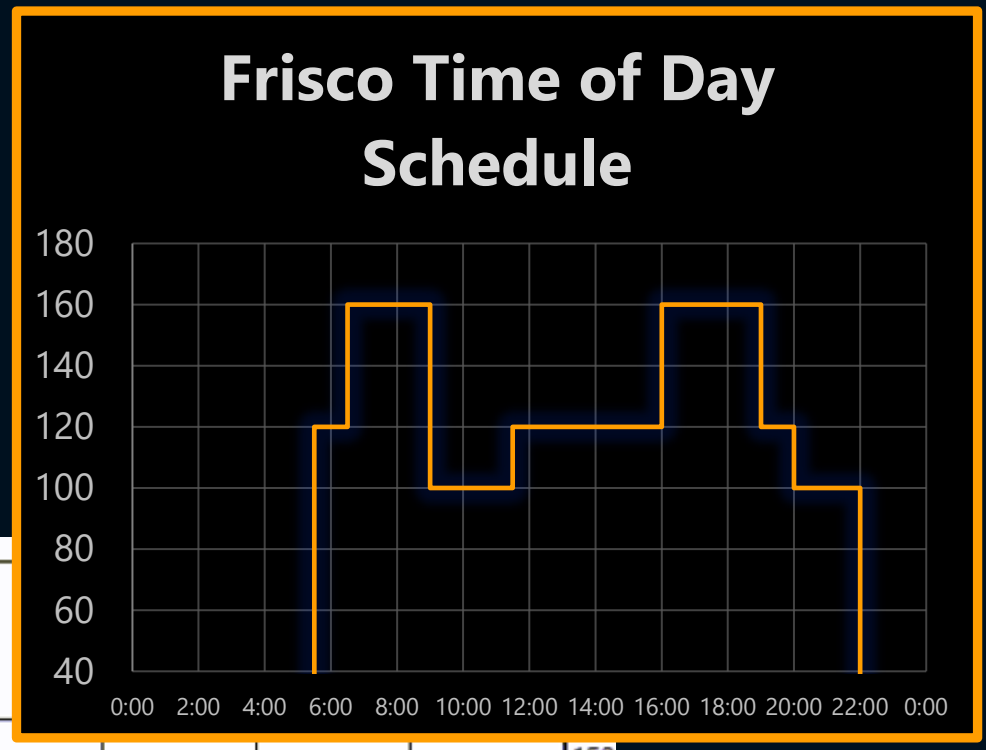
- Count verification
  - Compared reported volumes to manual counts
  - 15-min periods with various lighting conditions
  - >95% accuracy

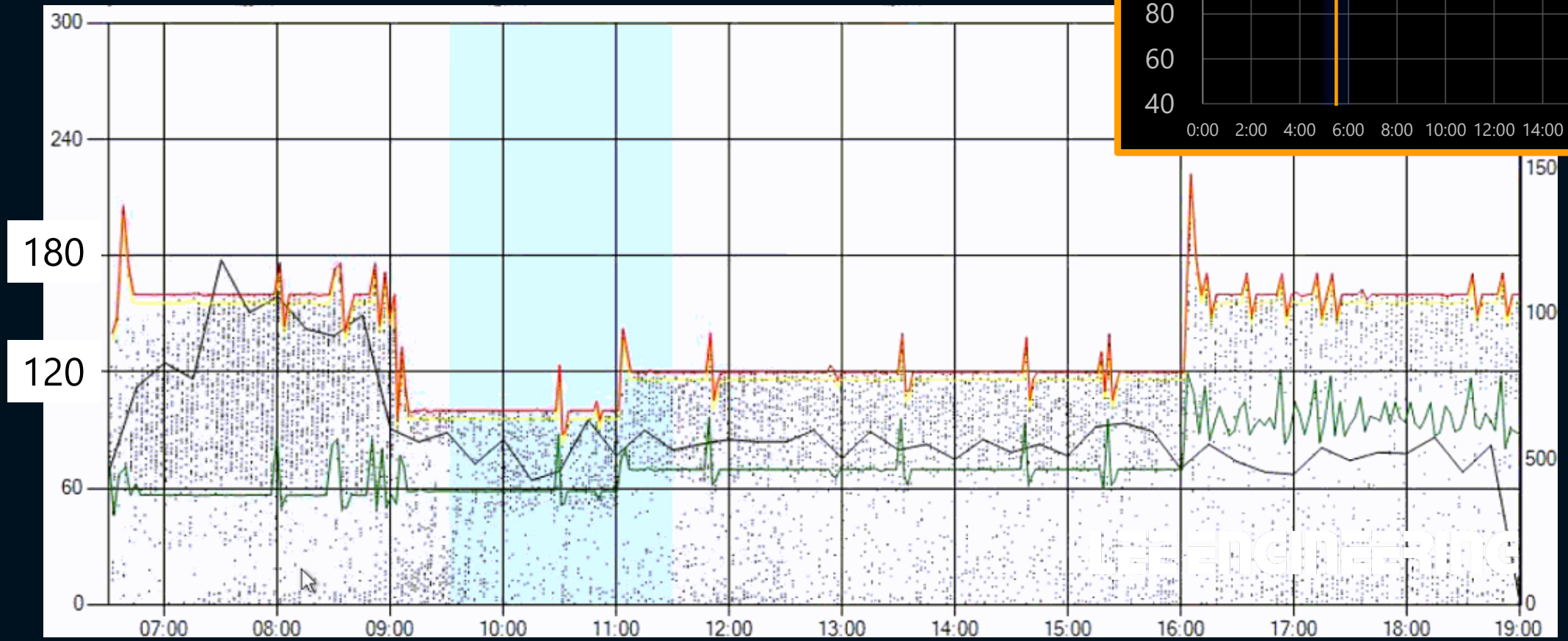
Study Schedule

- WEEK 1 – Neotraditional
- WEEK 2 – SynchroGreen full adaptive (current operation)
- WEEK 3 – SynchroGreen – splits only mode
- WEEK 4 – ITC City Pilot – suggested split changes

Neotraditional

- Time of Day coord plans (fine tuned)



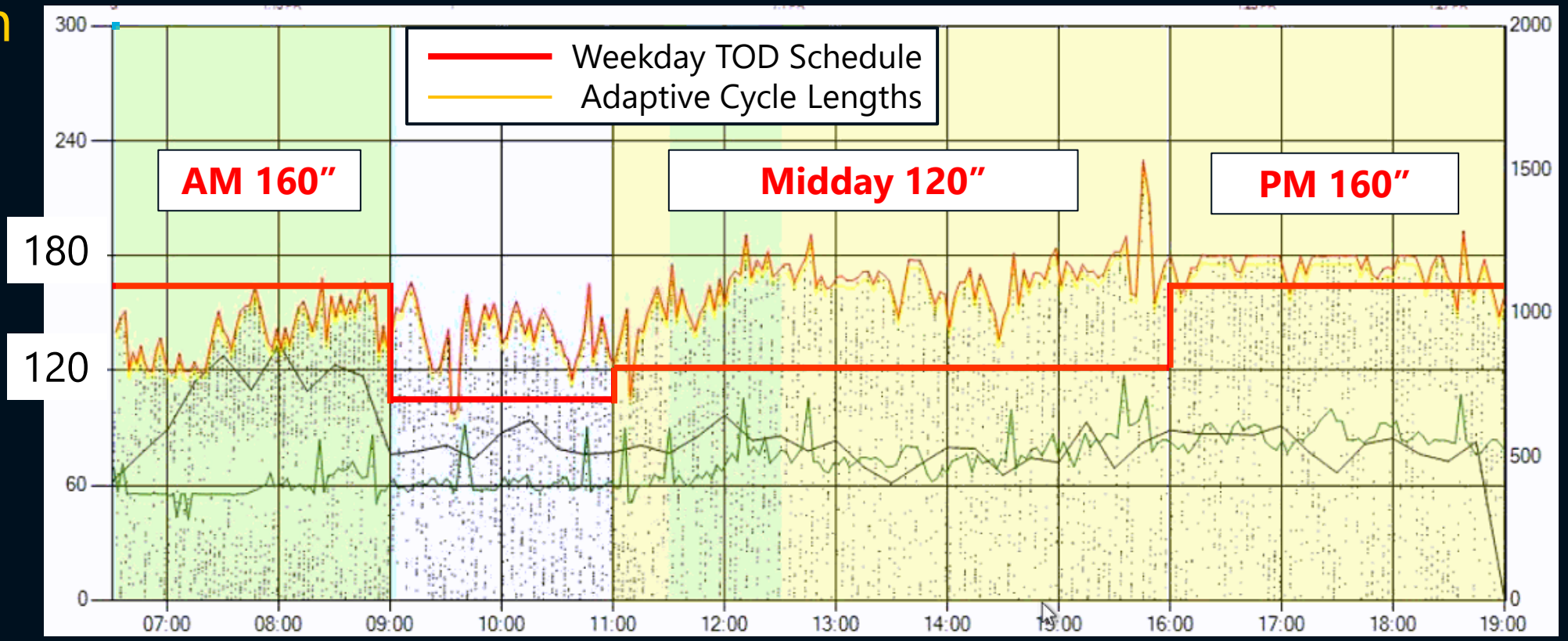


SynchroGreen Configuration

- Configured for Balanced Mode
- Runs 3 scenarios per day
  - AM – Favors southbound commute
  - Off Peak & Weekend – Dual Progression important
    - Minor movement splits allowed to be more generous
  - PM – Favors northbound commute

SynchroGreen Full Adaptive

- Cycle Length
- Offset
- Splits



SynchroGreen Full Adaptive

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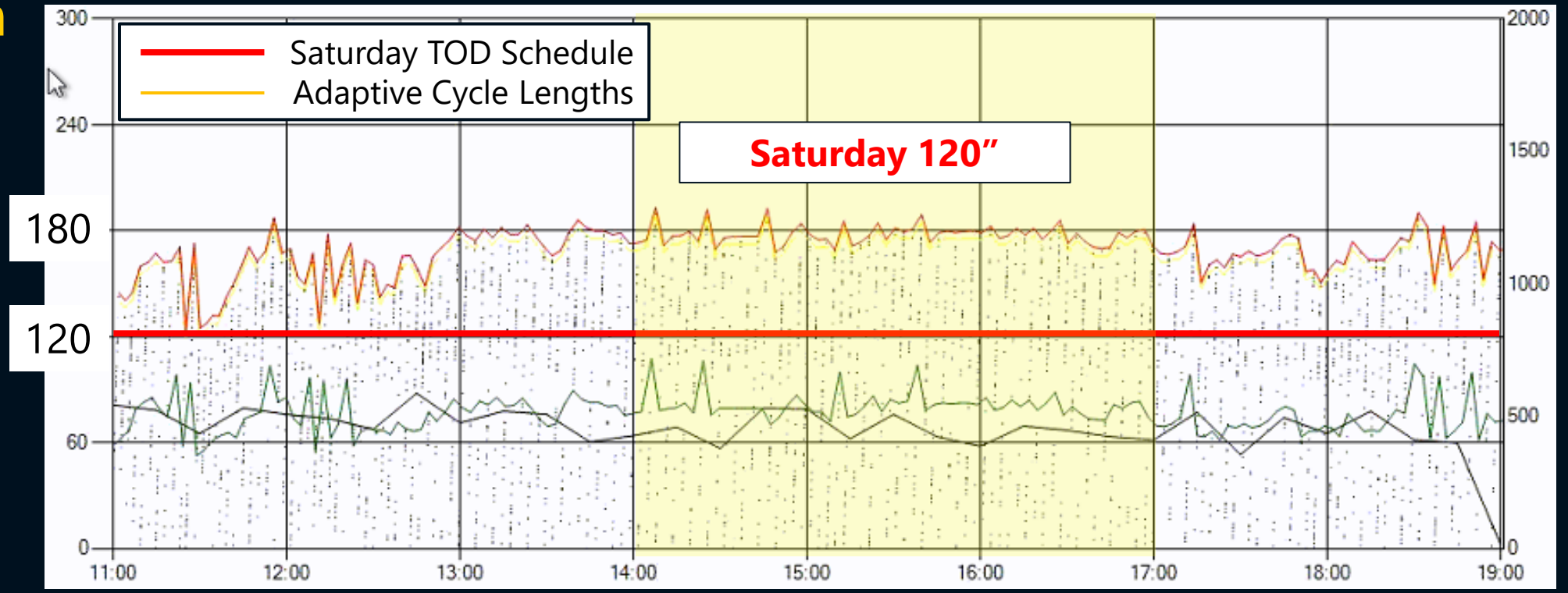
- Splits



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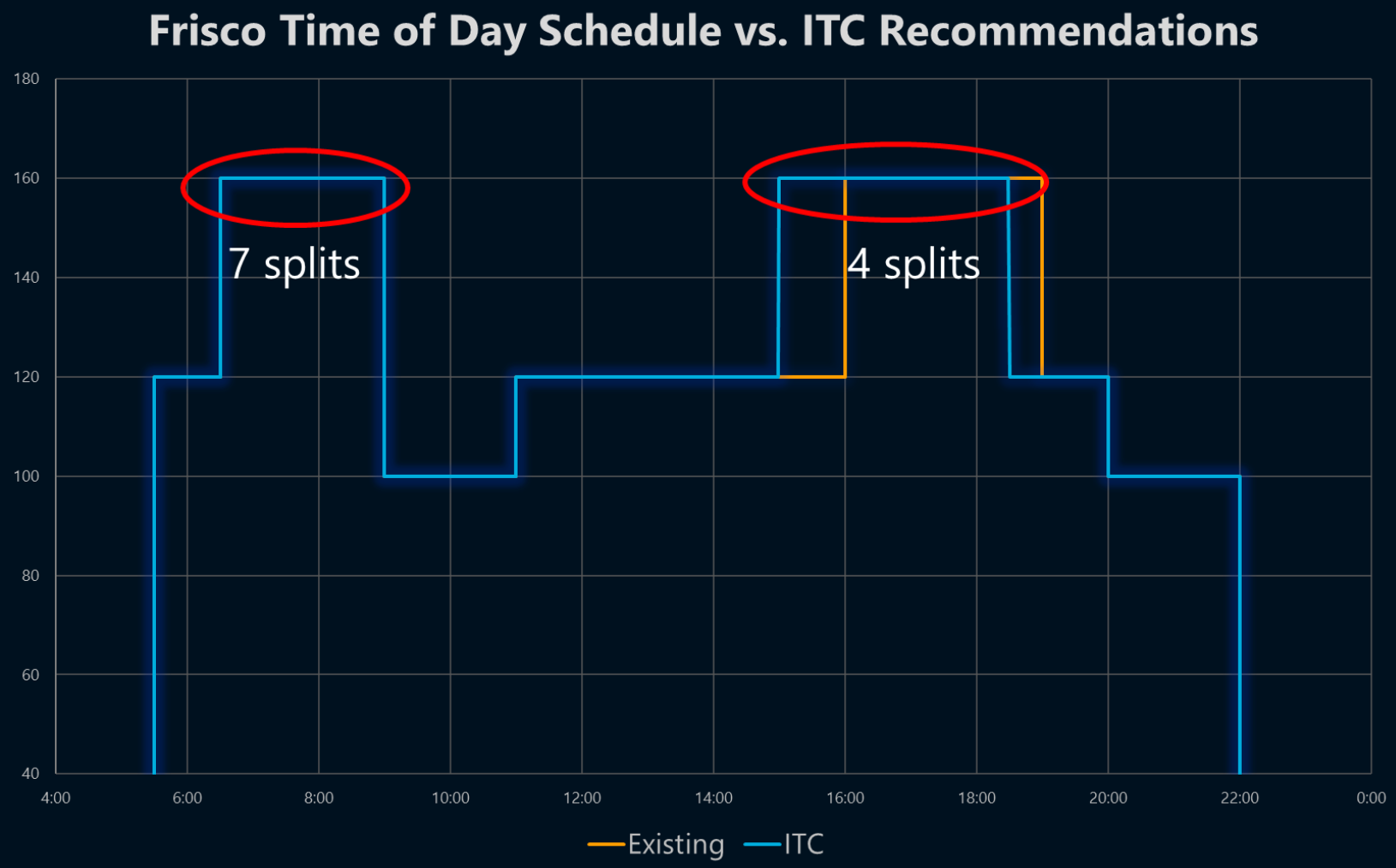
ITC City algorithm recommended timings

ITC City

- Original proposal was frequent split changes within peaks
- City requested single plan per peak for initial implementation



Project Goals

- What is the best strategy for this type of corridor?
- Can algorithm-based methods help minor movements without unduly harming progression?
- Are the advantages of frequent adaptive timing changes worth the downside of extra transitions?

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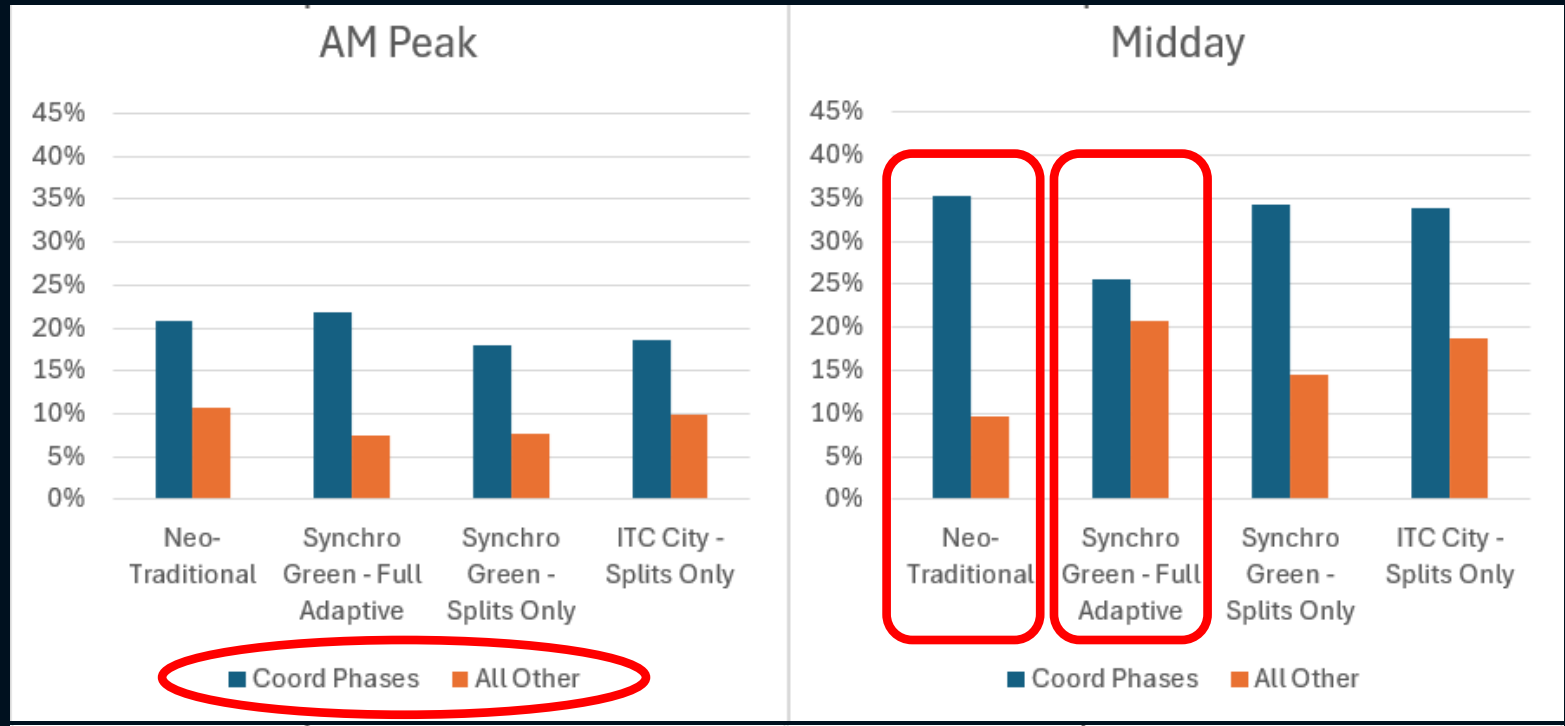
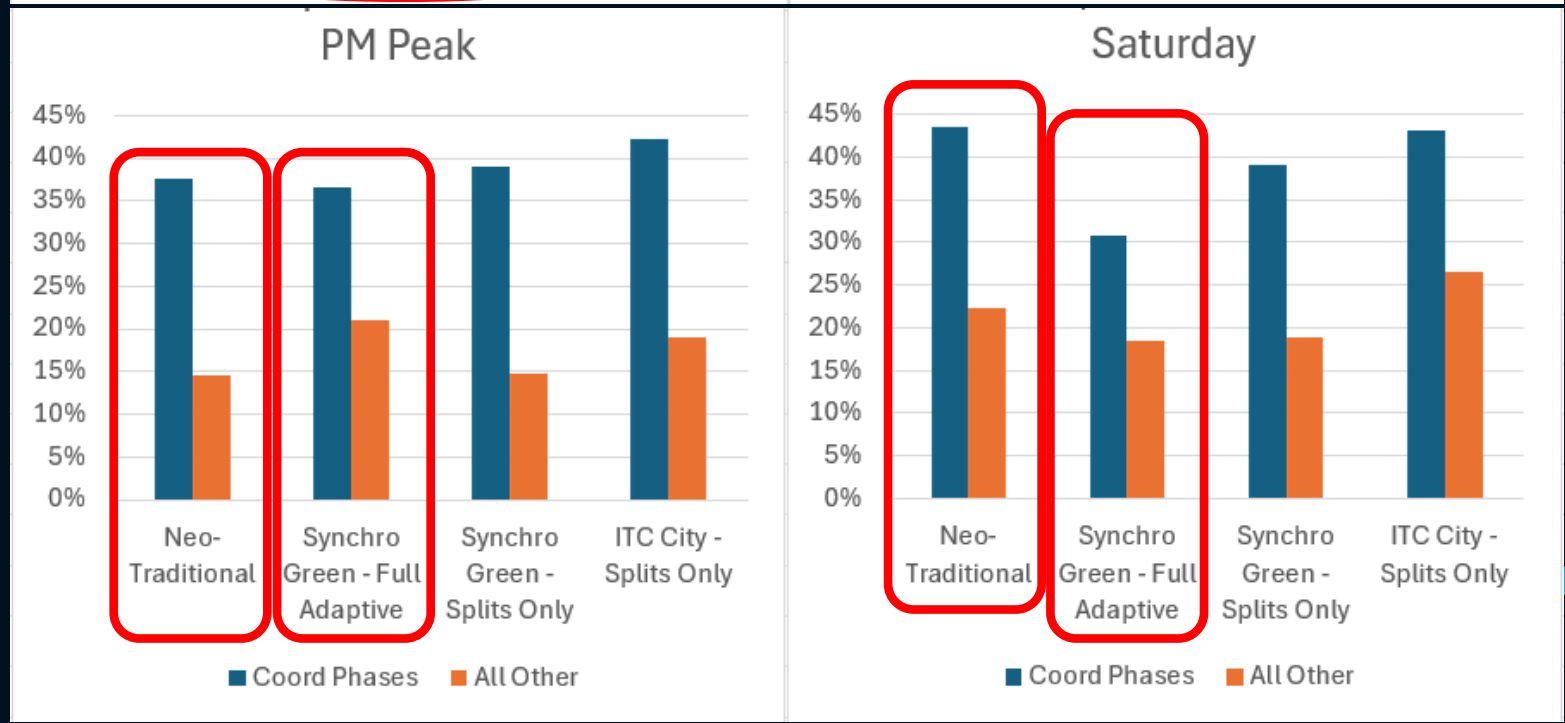
Study Results

Split Failures

ATSPM

- All algorithm-based strategies balance split failures
- Improves Coord Phases but at the expense of others



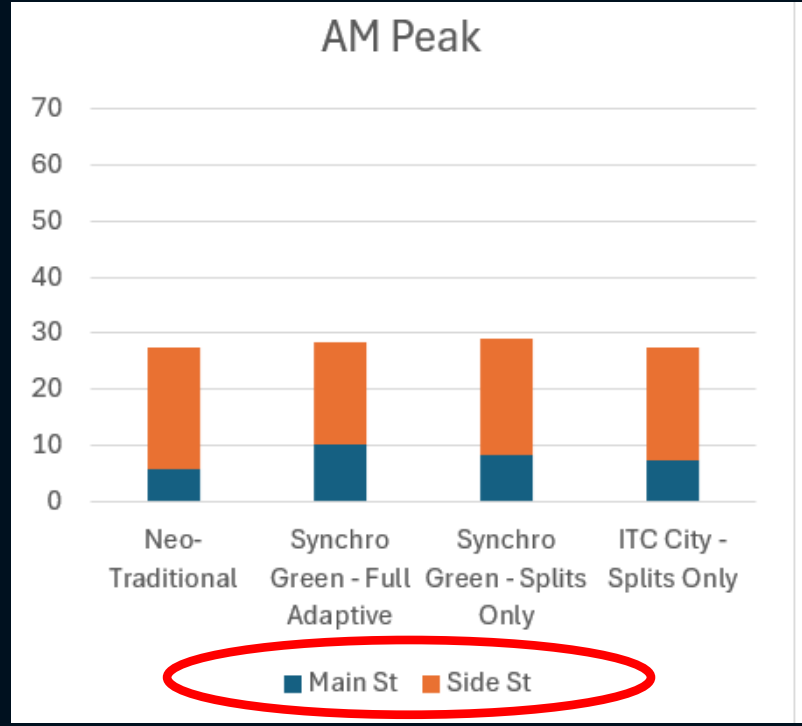


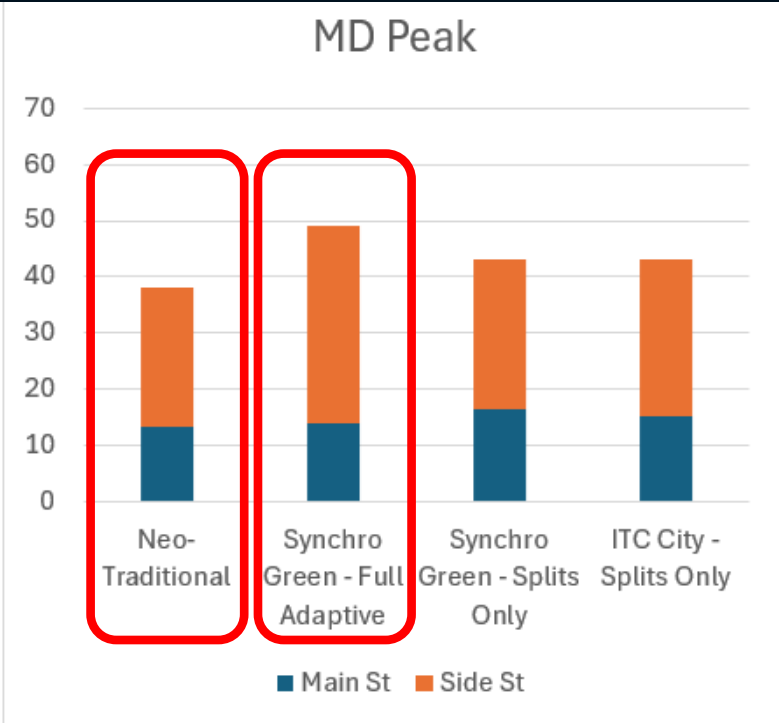
Study Results

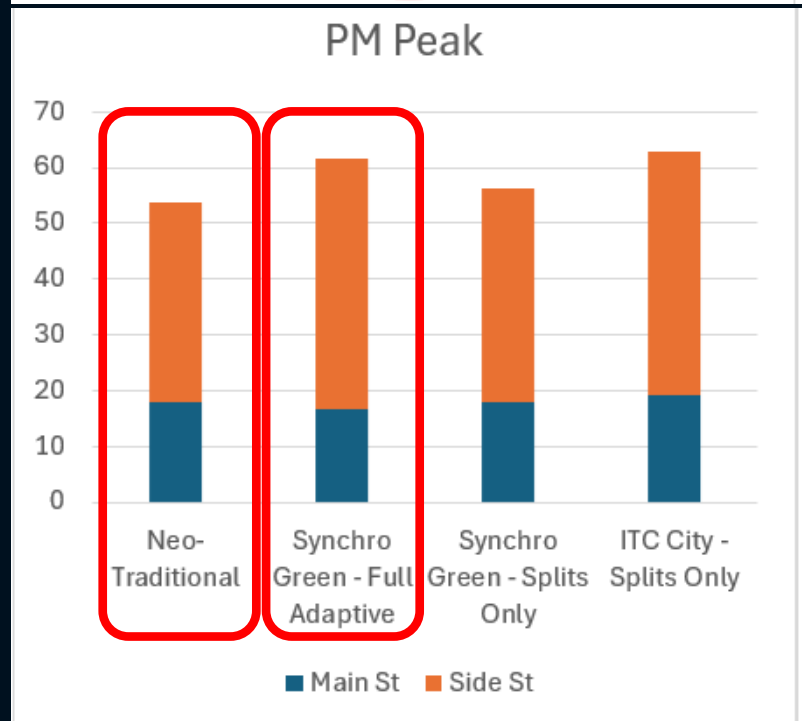
Network Delay

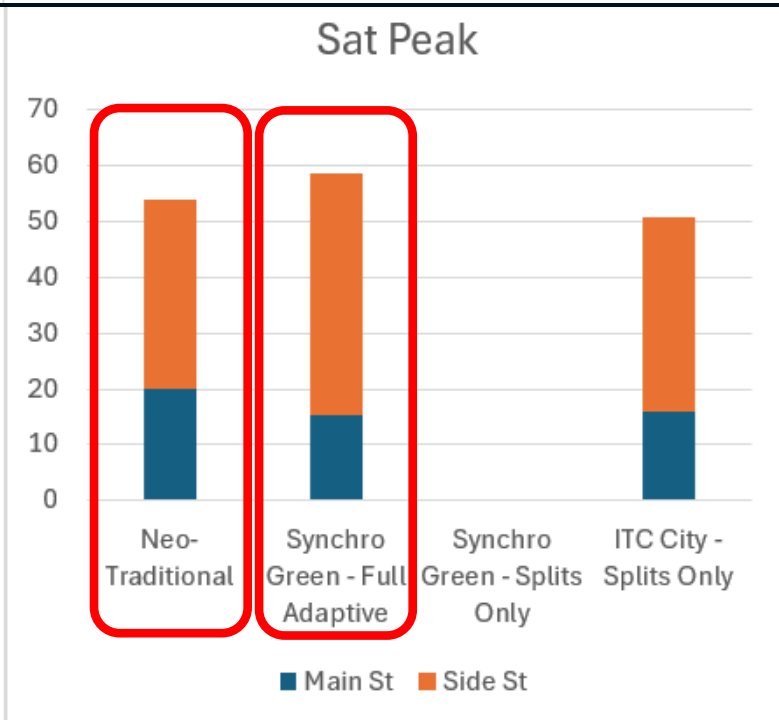
ATSPM

- Balancing split failures results in higher overall delay









Platoon Ratio

Platoon Ratio describes the quality of vehicle progression through an intersection. Higher ratios denote higher degrees of platooning.

$$R_p = \frac{P}{g/C} = \frac{P\ C}{g}$$

P = proportion of vehicles arriving on green, AoG%

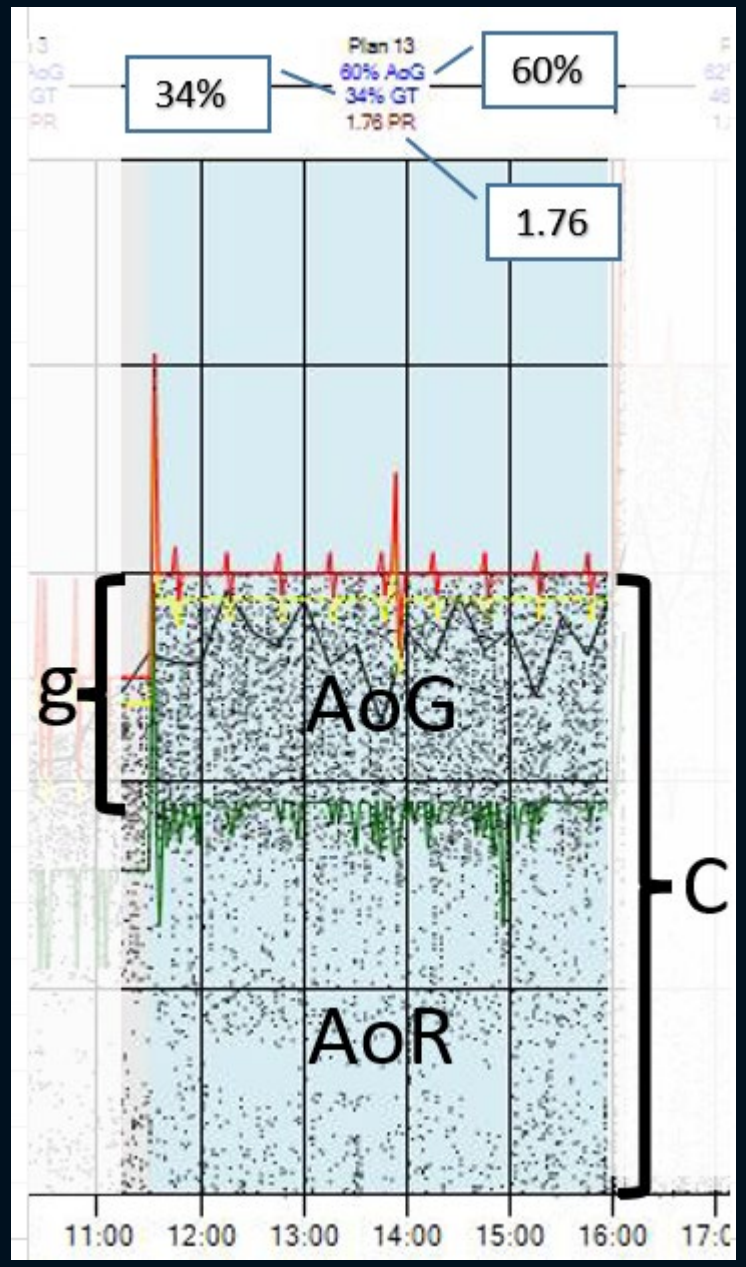
g = length of green in the cycle, s

C = overall cycle length, s

Platoon Ratio

$$R_p = \frac{P}{g/C} = \frac{P\ C}{g}$$

Purdue Coordination Diagram

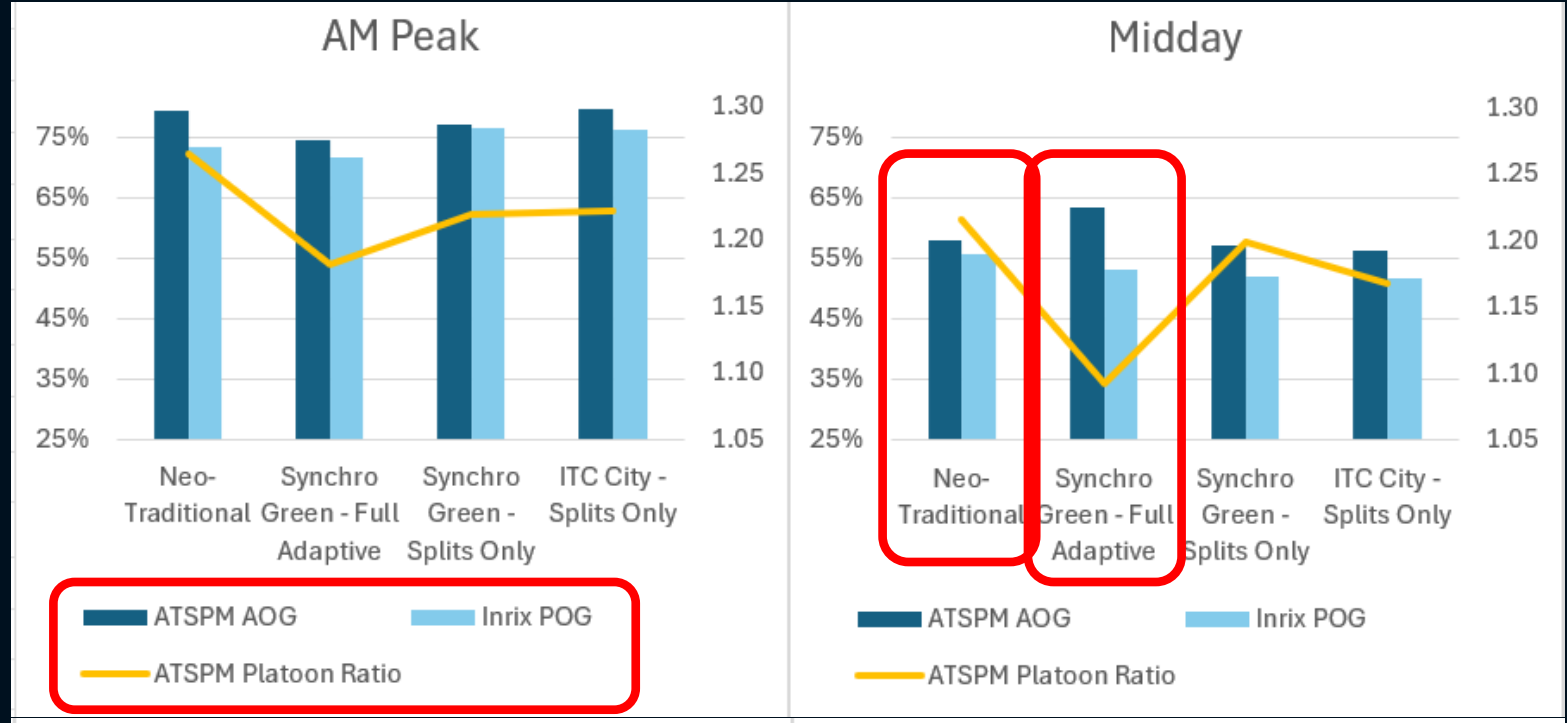


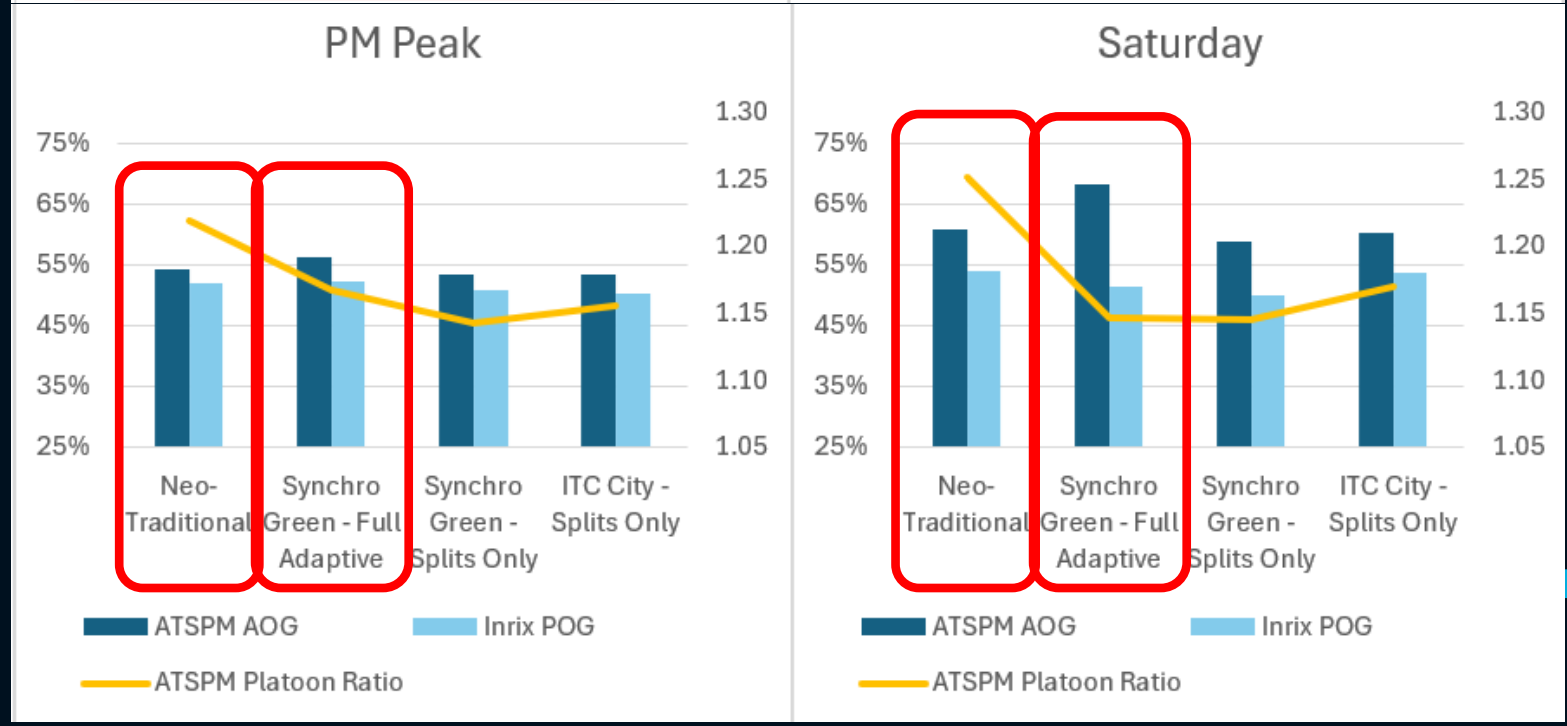
Study Results

Arrivals on Green

ATSPM & Inrix Signal Analytics

- Full adaptive had:
  - Improved Arrivals on Green
  - Lowest Platoon Ratio
- Any improvements to AOG% likely result of longer cycle lengths





Lessons Learned

- Already had good corridor timing plans – hard to beat
- Algorithm-based strategies got close
  - With locked-down parameters
  - Built enough trust to “loosen the chains” for next round

Next Steps

- Open up limits on SynchroGreen
  - cycle length upper limit
  - phase split min/max
- “Isolated” intersection SynchroGreen (3 locations)
  - Splits only mode at key intersection within a coordinated system
- ITC City full adaptive

Thank you!

Kirk Houser, P.E.
khouser@friscotexas.gov

Mike Wobken, P.E., PTOE
mwobken@lee-eng.com

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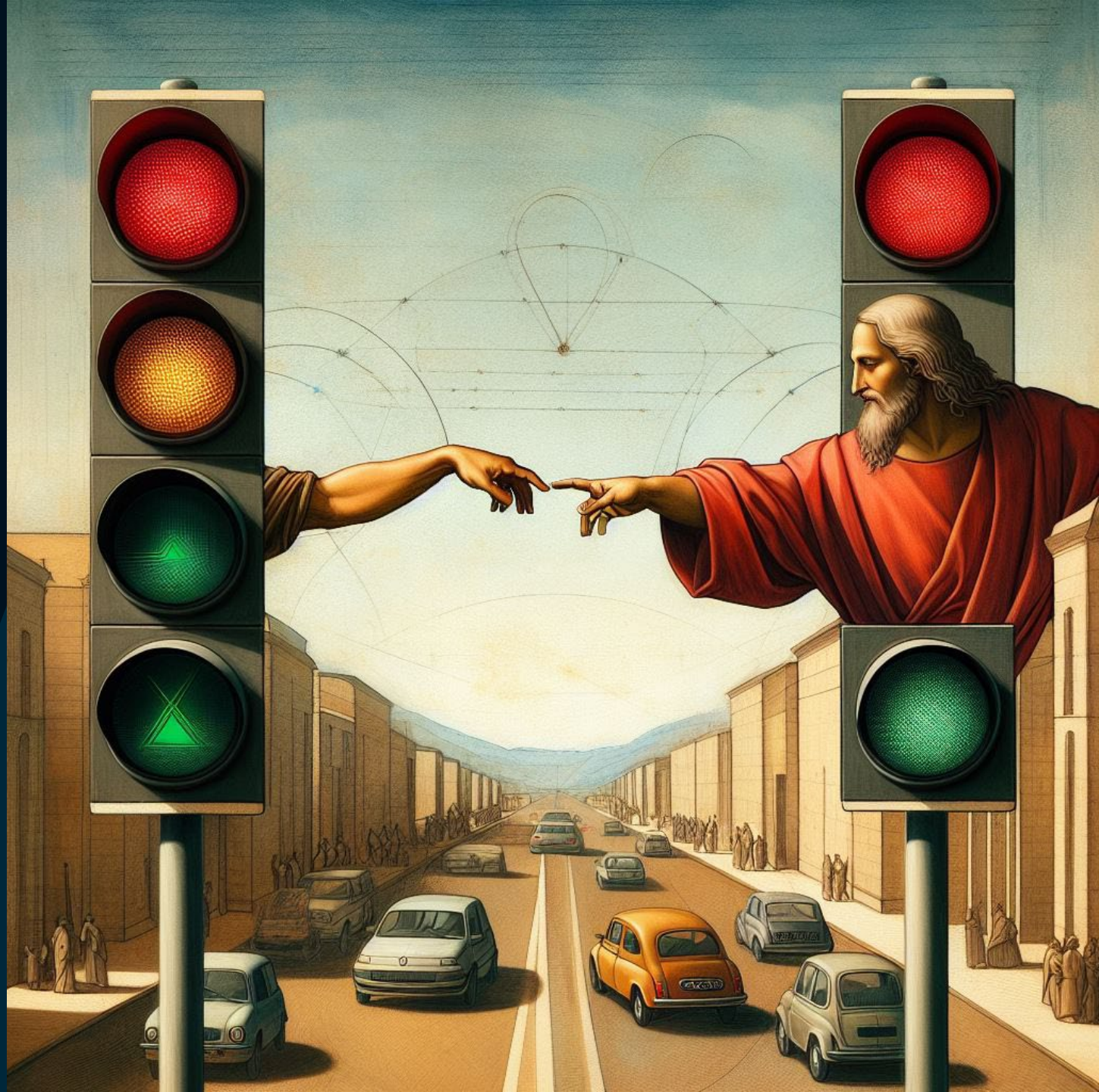


Slides that need a home

Extra

- Not sure where: (maybe a slide showing Purdue Coord diagram with adaptive on) – move this to synchro green area
-
- Not sure where: (mention - detection needed for adaptive is same as what is needed for ATSPM)

Performance Measures

Extra

- Slide mentioning evaluation using performance measures
- Not traditional timing methods

- KH will build a slide similar to other slides I have used before
  - List of which performance measures used for what.

Initial Timings Tweaks

- Using performance measures – Lee provided tweaks to existing plans
- Goal – help with minor movements w/o harming Coord.
- Before & after split failures & AoG%

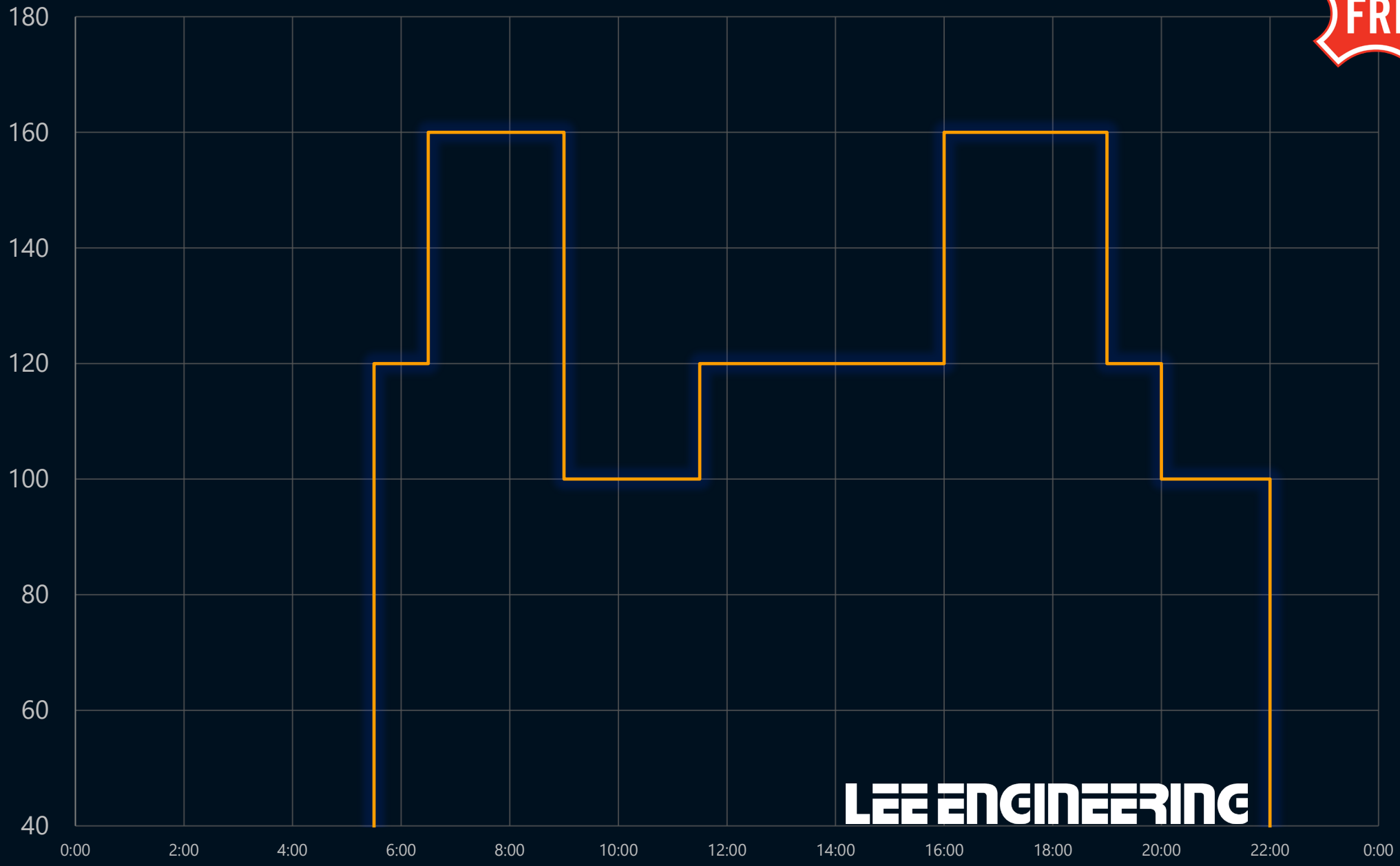
ITC City Pilot Stages

- Phase 1 - Count verification - winter 2024-25
  - >95% accuracy vs. manual counts
- Phase 2 - Suggested Timing Plans – spring 2025
  - Recommended multiple plans per peak
  - Limited to single plan per peak at request of the City
- Phase 3 - Full adaptive - fall 2025
  - In development

SynchroGreen Splits Only

- (show Legacy and Main example)
- Did not test at Legacy and Main – did not want to activate a new license.
- Ran critical intersection (lock down cycle length) - let it change splits offsets only – on Preston
- This was tricky to set up – it would coord fail at plan changes and go back to backup timings. This took careful attention to “lag” settings

Frisco Time of Day Schedule



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ITC City Evaluation

- Goal – help with minor movements w/o harming Coord.
- Before & after split failures & AoG%

ITC City Next Steps

- Next steps w/ ITC – attempting full adaptive
- List what we want to be configurable

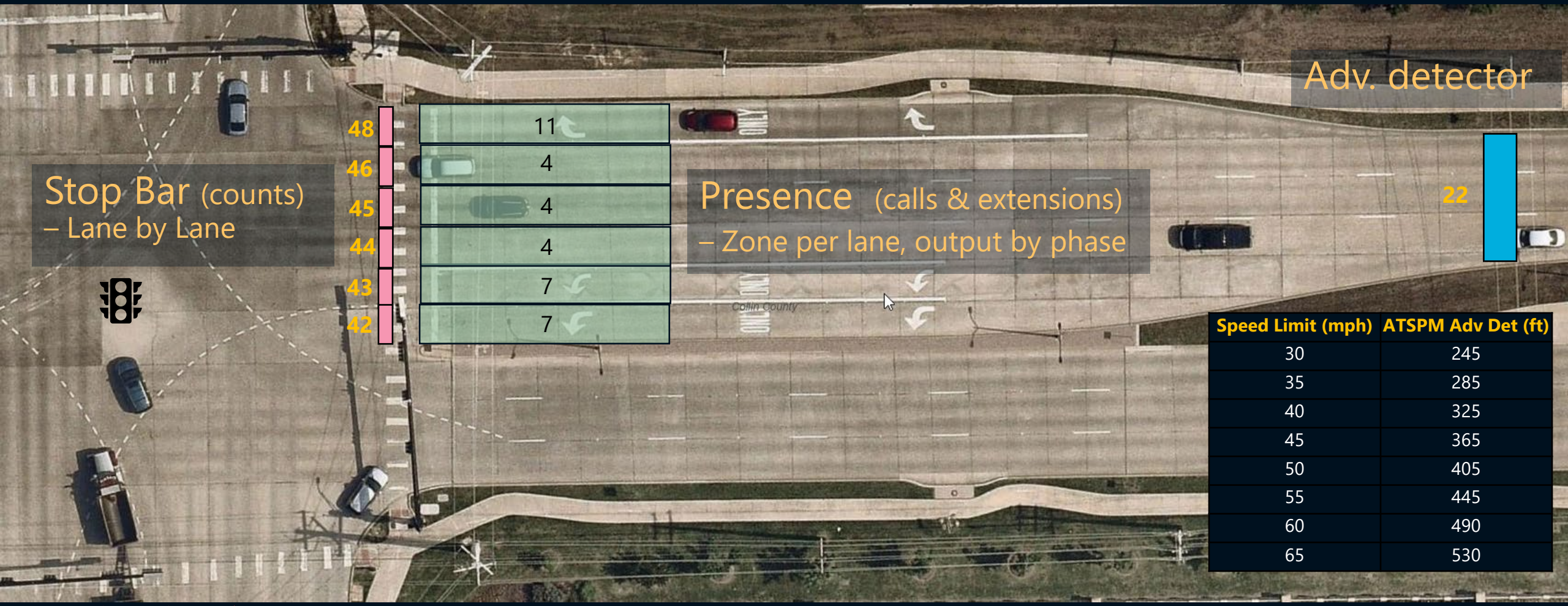
Maybe this slide goes at the end.

leave it here for now to match the early outline

SynchroGreen Evaulation

- Turned on 2020?
- How is it doing with Peak plans?
- How is it doing with minor movts midday & weekends ?

Frisco Detection Scheme



Speed Limit (mph)	ATSPM Adv Det (ft)
30	245
35	285
40	325
45	365
50	405
55	445
60	490
65	530

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SynchroGreen Configuaration

- Configured for Balance Mode
  - Limitation – this is not configurable by Time of Day
- Runs 3 scenarios per day
  - AM – Southbound commute is important
    - All signals look at Preston & Lebanon as the “Master”
  - Off Peak & Weekend – Dual Progression important
    - Minor movement splits allowed to be more generous
  - PM – Northbound commute is important
    - All signals look at Preston & Gaylord as the “Master”

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SynchroGreen Critical Intersection

- (show Legacy and Main example)
- Did not test at Legacy and Main – did not want to activate a new license.
- Ran critical intersection (lock down cycle length) - let it change splits offsets only – on the Preston.
- This was tricky to set up – it would coord fail at plan changes and go back to backup timings. This took careful attention to "lag" settings

SynchroGreen Critical Intersection

- Next step – Test it at an isolated intersection like Legacy Main

Conclusions

Extra

- Next steps
- ITC fully adaptive
- Synchro Critical Intersection – set up as intended.

Nicer looking slide?

TMC System Checks
- Labor intensive – worth it!

ATSPM Watchdog Report
- Labor intensive to setup & maintain
- Need extra (working) detection ($$$)
- More detail

INRIX Signal Analytics Performance Report
- Setup is easy
- Less detail than SPM
- Cheap if your MPO buys it for you!

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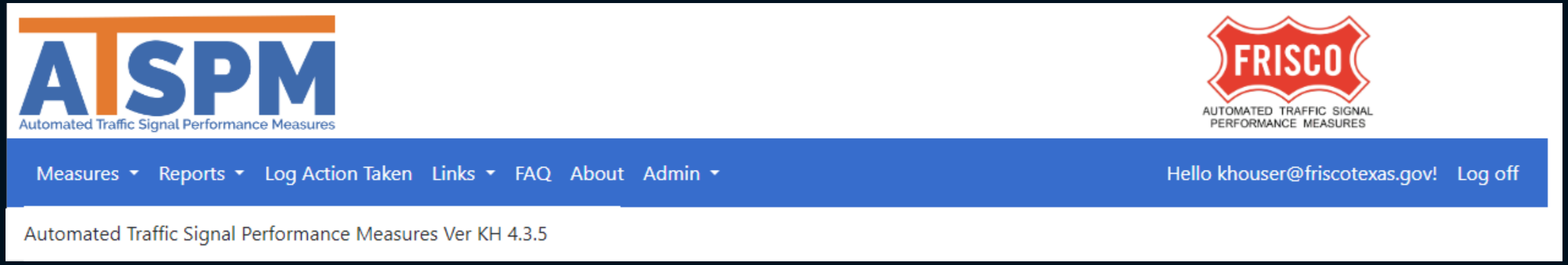
Extra slides start here

Extra

- Extra
- Extra

- The extra slides are mostly formatting template placeholders

ATSPM



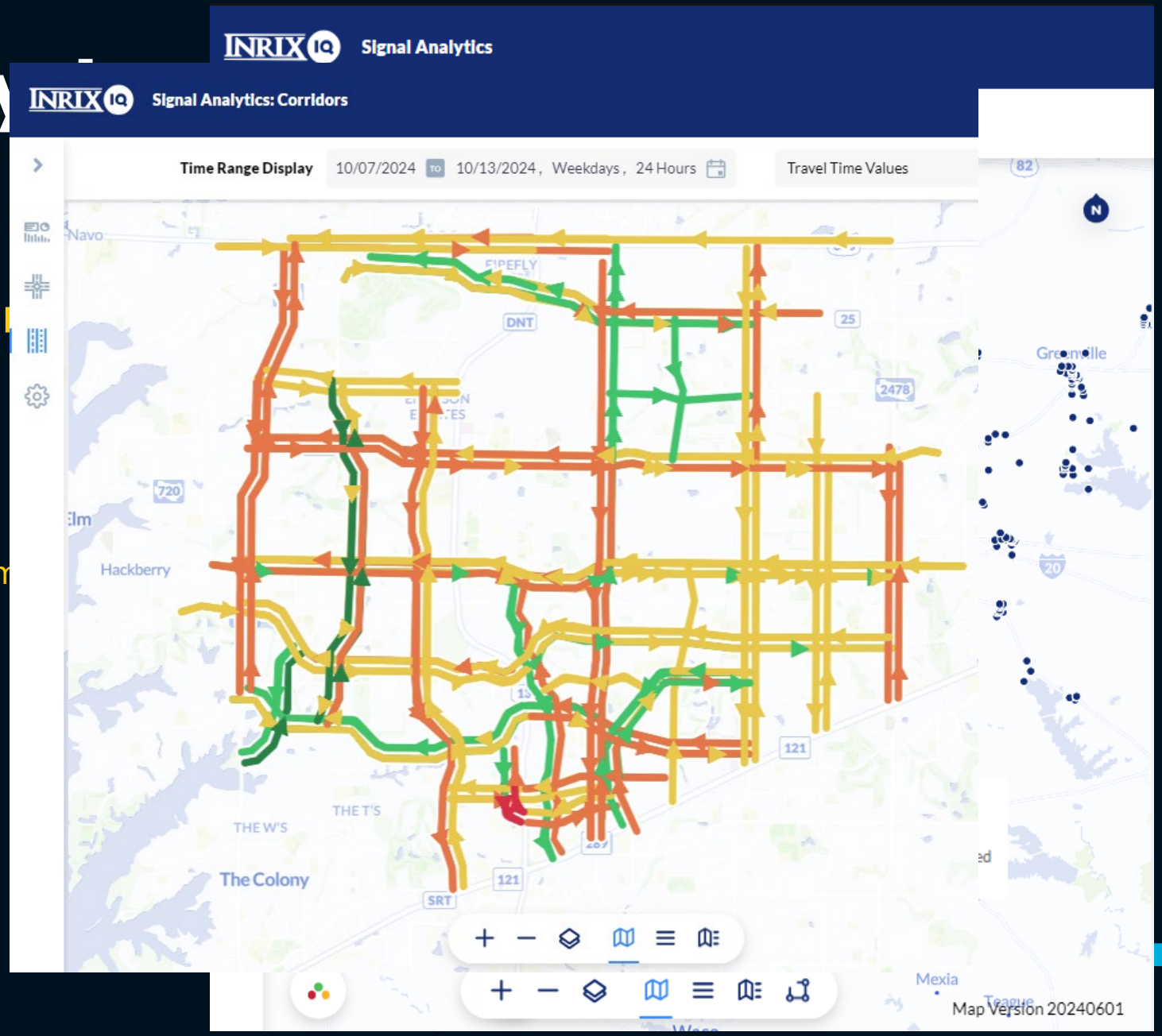
ATSPM – Frisco version of Utah DOT

- 7 years to setup
  - 5 years back end issues
  - 2 years configuration (detection)
- Version KH 4.3.5

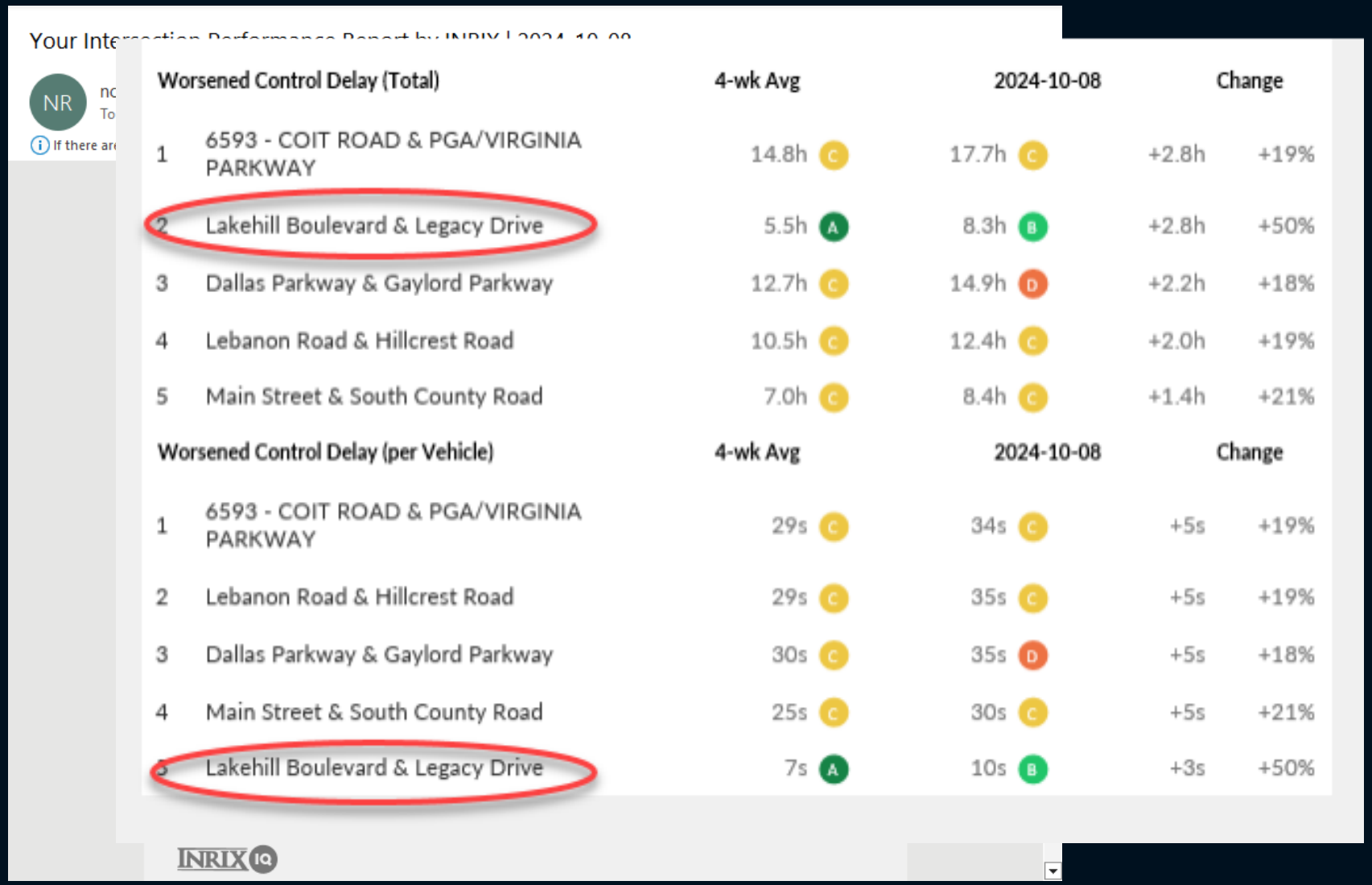
INRIX Signal Analy

INRIX Signal Analytics

- NCTCOG purchased a license fo
  regional operators (agencies)
- Setup by algorithm
  - NCTCOG Signal Inventory
    - Algorithm deduced approaches / movem
  - Agency QC each intersection
    - Kick off meeting on a Tuesday
    - Frisco finished QC on Thursday
    - and drew in all of our corridors



Example – Legacy & Lakehill



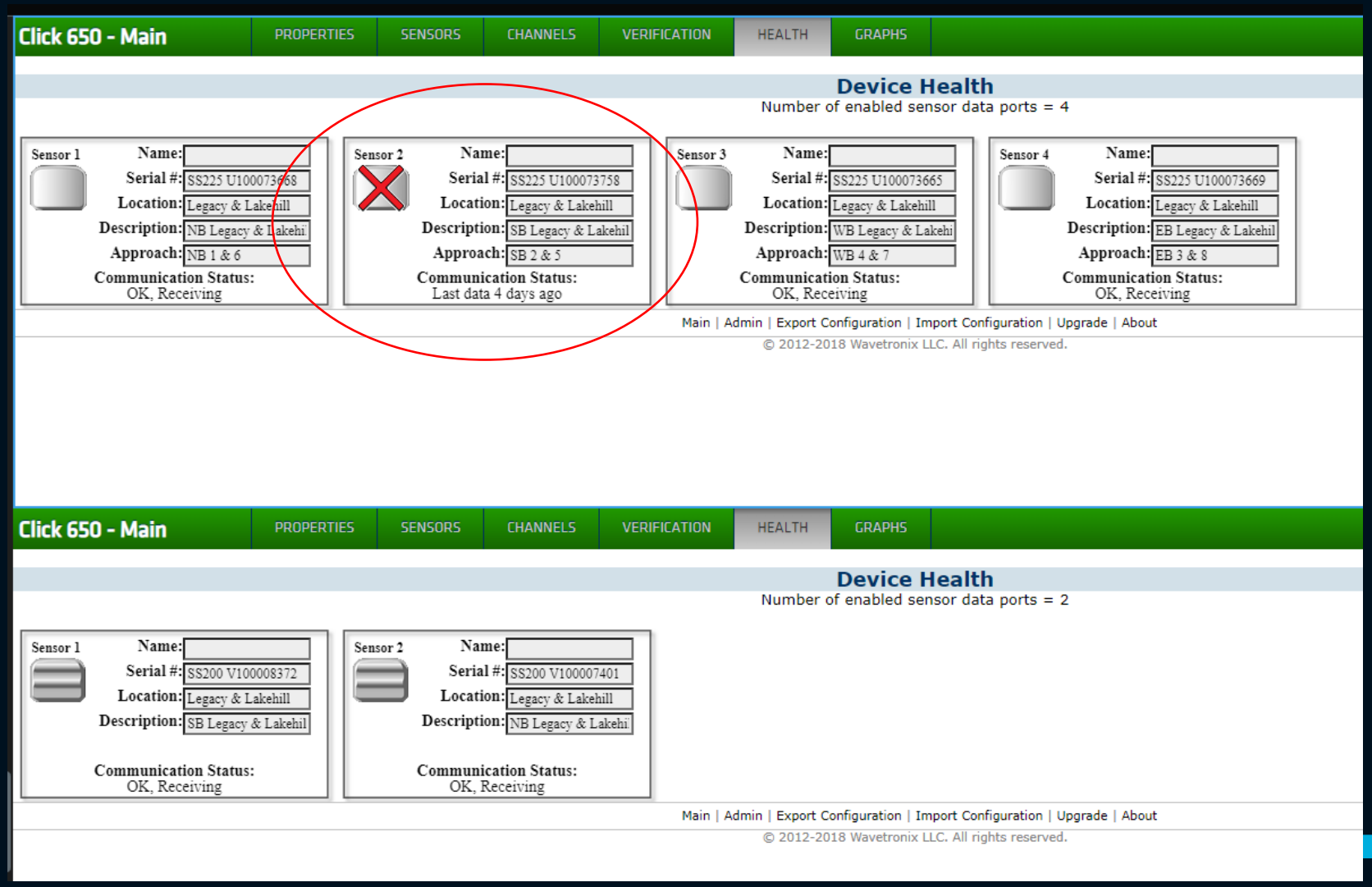
Worsened Control Delay (Total)		4-wk Avg	2024-10-08	Change	
1	6593 - COIT ROAD & PGA/VIRGINIA PARKWAY	14.8h C	17.7h C	+2.8h	+19%
2	Lakehill Boulevard & Legacy Drive	5.5h A	8.3h B	+2.8h	+50%
3	Dallas Parkway & Gaylord Parkway	12.7h C	14.9h D	+2.2h	+18%
4	Lebanon Road & Hillcrest Road	10.5h C	12.4h C	+2.0h	+19%
5	Main Street & South County Road	7.0h C	8.4h C	+1.4h	+21%

Worsened Control Delay (per Vehicle)		4-wk Avg	2024-10-08	Change	
1	6593 - COIT ROAD & PGA/VIRGINIA PARKWAY	29s C	34s C	+5s	+19%
2	Lebanon Road & Hillcrest Road	29s C	35s C	+5s	+19%
3	Dallas Parkway & Gaylord Parkway	30s C	35s D	+5s	+18%
4	Main Street & South County Road	25s C	30s C	+5s	+21%
5	Lakehill Boulevard & Legacy Drive	7s A	10s B	+3s	+50%

Example – Legacy & Lakehill

Broken Radar Panel

- Caught it before the system check
- Citizen email came in the next week



Example – Hillcrest & Lebanon

ATSPM Alerts for 9/8/2024

--The following signals had too many max out occurrences between 1:00 and 5:00:
135 - Championship & US 380 - Phase 1 (Max Outs 100%)
135 - Championship & US 380 - Phase 2 (Max Outs 100%)
135 - Championship & US 380 - Phase 3 (Max Outs 100%)
135 - Championship & US 380 - Phase 4 (Max Outs 100%)
135 - Championship & US 380 - Phase 5 (Max Outs 100%)
135 - Championship & US 380 - Phase 6 (Max Outs 100%)
135 - Championship & US 380 - Phase 7 (Max Outs 100%)
135 - Championship & US 380 - Phase 8 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 1 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 2 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 3 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 4 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 5 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 6 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 7 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 8 (Max Outs 100%)
245 - Legacy & US 380 - Phase 1 (Max Outs 100%)
245 - Legacy & US 380 - Phase 2 (Max Outs 100%)
245 - Legacy & US 380 - Phase 3 (Max Outs 100%)
245 - Legacy & US 380 - Phase 4 (Max Outs 100%)
245 - Legacy & US 380 - Phase 5 (Max Outs 100%)
245 - Legacy & US 380 - Phase 6 (Max Outs 100%)
245 - Legacy & US 380 - Phase 7 (Max Outs 100%)
245 - Legacy & US 380 - Phase 8 (Max Outs 100%)
663 - Preston & Hickory - Phase 4 (Max Outs 100%)
663 - Preston & Hickory - Phase 6 (Max Outs 100%)
663 - Preston & Hickory - Phase 8 (Max Outs 100%)
810 - Hillcrest & Lebanon - Phase 2 (Max Outs 100%)
810 - Hillcrest & Lebanon - Phase 4 (Max Outs 100%)
810 - Hillcrest & Lebanon - Phase 6 (Max Outs 100%)
810 - Hillcrest & Lebanon - Phase 8 (Max Outs 100%)

Construction

Construction

Construction

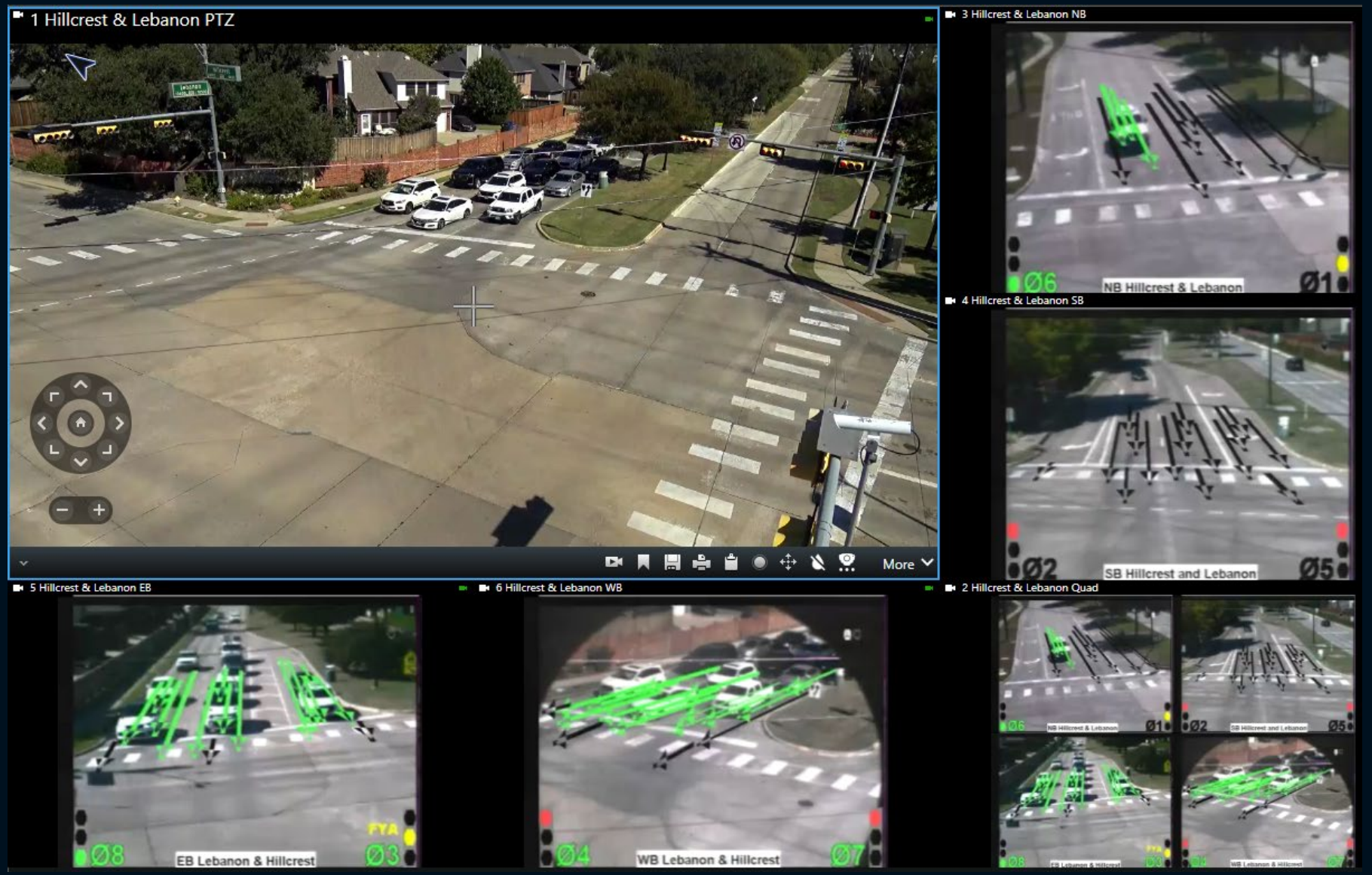
System check

Huh??

INRIX IQ

Intersections: Top 5 Control Delay Issues	2024-09-08	24 Hrs		
Worsened Control Delay (Total)	**4-wk Avg**	**2024-09-08**	**Change**	
1 FM 423 & US 380	42.4h E	46.3h E	+3.9h	+9%
2 East Eldorado Parkway & Farm-to-Market Road 423	36.1h C	39.6h D	+3.5h	+10%
3 Lebanon Road & Coit Road	4.7h B	7.8h B	+3.0h	+65%
4 Rolater Road & Independence Parkway	8.7h C	11.4h C	+2.7h	+31%
5 Championship Drive & US 380	20.9h D	23.3h D	+2.4h	+12%
Worsened Control Delay (per Vehicle)	**4-wk Avg**	**2024-09-08**	**Change**	
1 Lebanon Road & Hillcrest Road	19s B	26s C	+8s	+41%
2 Lebanon Road & Coit Road	11s B	18s B	+7s	+65%
3 Rolater Road & Independence Parkway	23s C	30s C	+7s	+31%
4 FM 423 & US 380	70s E	77s E	+6s	+9%
5 Legacy Drive & US 380	28s C	34s C	+5s	+19%

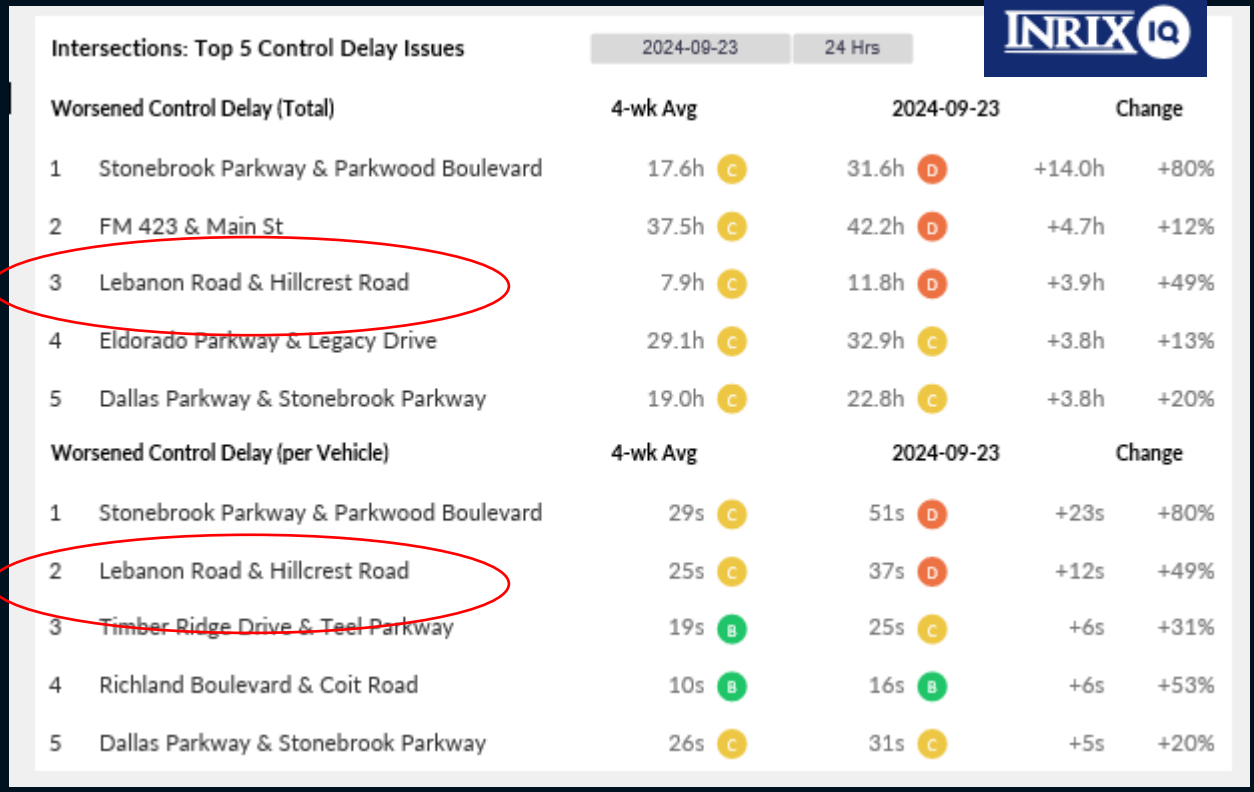
Example – Hillcrest & Lebanon



Example – Hillcrest & Lebanon

Problem comes back

- 2 weeks later



Intersections: Top 5 Control Delay Issues	2024-09-23	24 Hrs			
Worsened Control Delay (Total)	**4-wk Avg**		**2024-09-23**	**Change**	
1 Stonebrook Parkway & Parkwood Boulevard	17.6h C		31.6h D	+14.0h	+80%
2 FM 423 & Main St	37.5h C		42.2h D	+4.7h	+12%
3 Lebanon Road & Hillcrest Road	7.9h C		11.8h D	+3.9h	+49%
4 Eldorado Parkway & Legacy Drive	29.1h C		32.9h C	+3.8h	+13%
5 Dallas Parkway & Stonebrook Parkway	19.0h C		22.8h C	+3.8h	+20%
Worsened Control Delay (per Vehicle)	**4-wk Avg**		**2024-09-23**	**Change**	
1 Stonebrook Parkway & Parkwood Boulevard	29s C		51s D	+23s	+80%
2 Lebanon Road & Hillcrest Road	25s C		37s D	+12s	+49%
3 Timber Ridge Drive & Teel Parkway	19s B		25s C	+6s	+31%
4 Richland Boulevard & Coit Road	10s B		16s B	+6s	+53%
5 Dallas Parkway & Stonebrook Parkway	26s C		31s C	+5s	+20%

Force Off – (Coord)

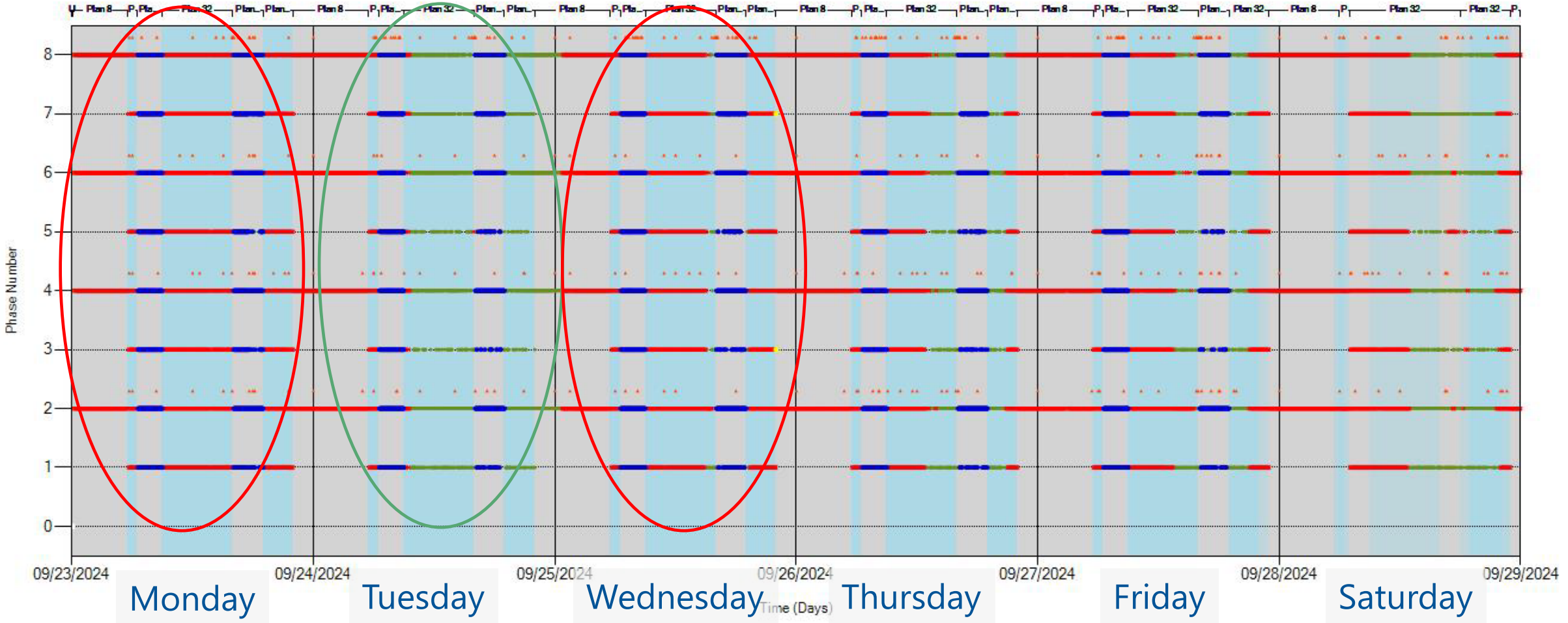
Gap out

Max out

Purdue Phase Termination

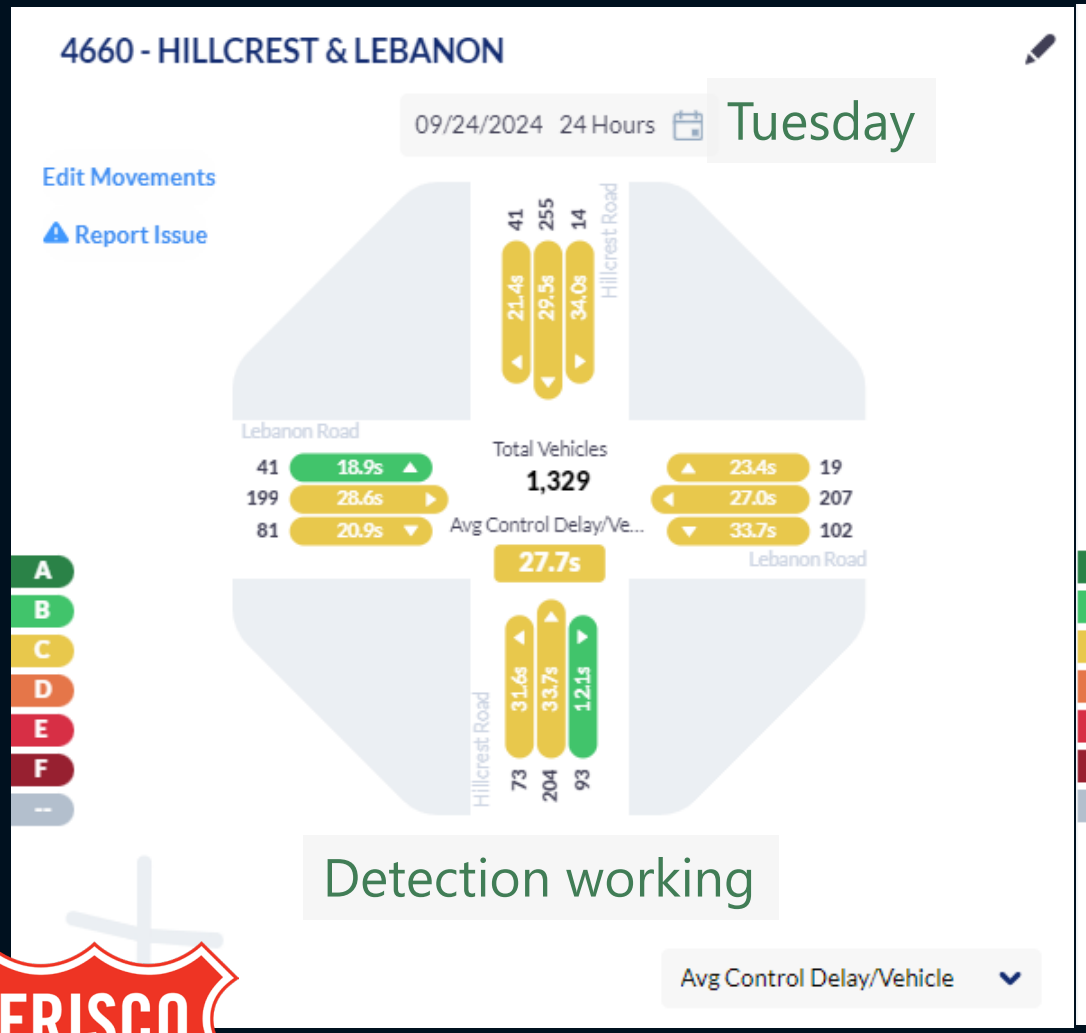
Hillcrest @ Lebanon - SIG#810
Monday, September 23, 2024 12:00 AM - Sunday, September 29, 2024 12:00 AM

Currently showing Force-Offs, Max-Outs and Gap-Outs with a consecutive occurrence of 3 or more.
Pedestrian events are never filtered

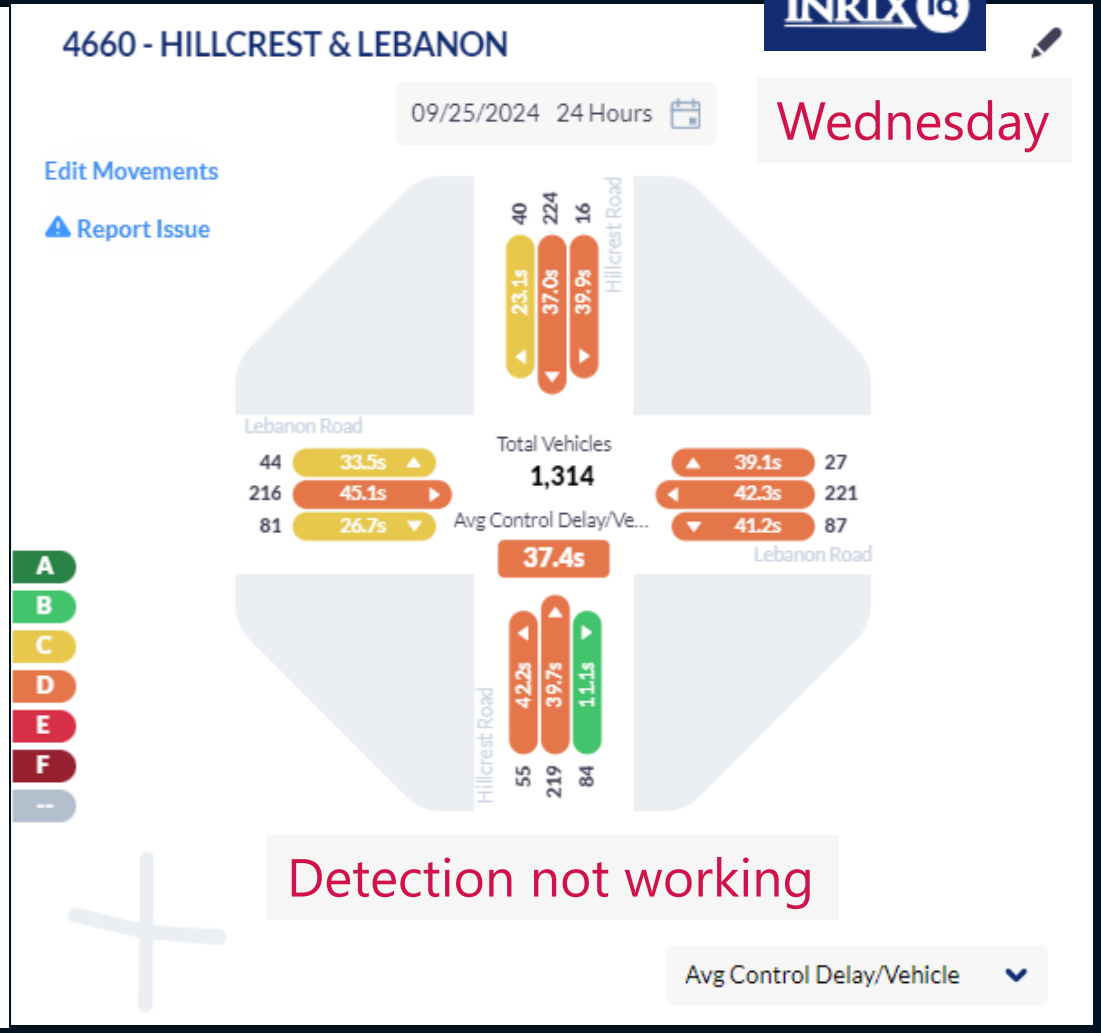


Monday Tuesday Wednesday Thursday Friday Saturday

Example – Hillcrest & Lebanon



Detection working



Detection not working

Example – Hillcrest & Lebanon

Mystery Problem

- INRIX showed same level of traffic – very different driver experience
- ATSPM showed the max outs
  - Traditional Split History report from the ATMS

Split History with Max(M),Gap(G), and Force-off(F)

Report Date: 10/18/2024

Begin Date: 09/23/2024 **Begin Time:** 00:00:00
End Date: 10/25/2024 **End Time:** 23:59:59
Time Span: Continuous **Days Of Week:** [All]
Flex Group: [All] **Phases:** 1-16

Controller: 810 Hillcrest - Lebanon CMDR

Date/Time	Pattern	Cycle	SP1 (NL)	SP2* (SR)	SP3 (EL)	SP4 (WT)	SP5 (SL)	SP6* (NR)	SP7 (WL)	SP8 (ET)	SP9	SP10	SP11	SP12	SP13	SP14	SP15	SP16
09/23/2024 00:00:11	254	148	0	133/G	0	15/G	0	133/G	0	15/G	0	0	0	0	0	0	0	0
09/23/2024 00:02:39	254	31	0	17/G	0	14/G	0	17/G	0	14/G	0	0	0	0	0	0	0	0
09/23/2024 00:03:10	254	90	0	74/G	0	16/G	0	74/G	0	16/G	0	0	0	0	0	0	0	0
09/23/2024 00:04:40	254	157	0	142/G	0	15/G	0	142/G	0	15/G	0	0	0	0	0	0	0	0
09/23/2024 00:07:18	254	151	0	136/G	0	15/G	0	136/G	0	15/G	0	0	0	0	0	0	0	0
09/23/2024 00:09:49	254	40	0	16/G	0	24/G	0	16/G	0	24/G	0	0	0	0	0	0	0	0

Example – Coit & Lebanon

Intersections: Top 5 Control Delay Issues 2024-09-10 24 Hrs

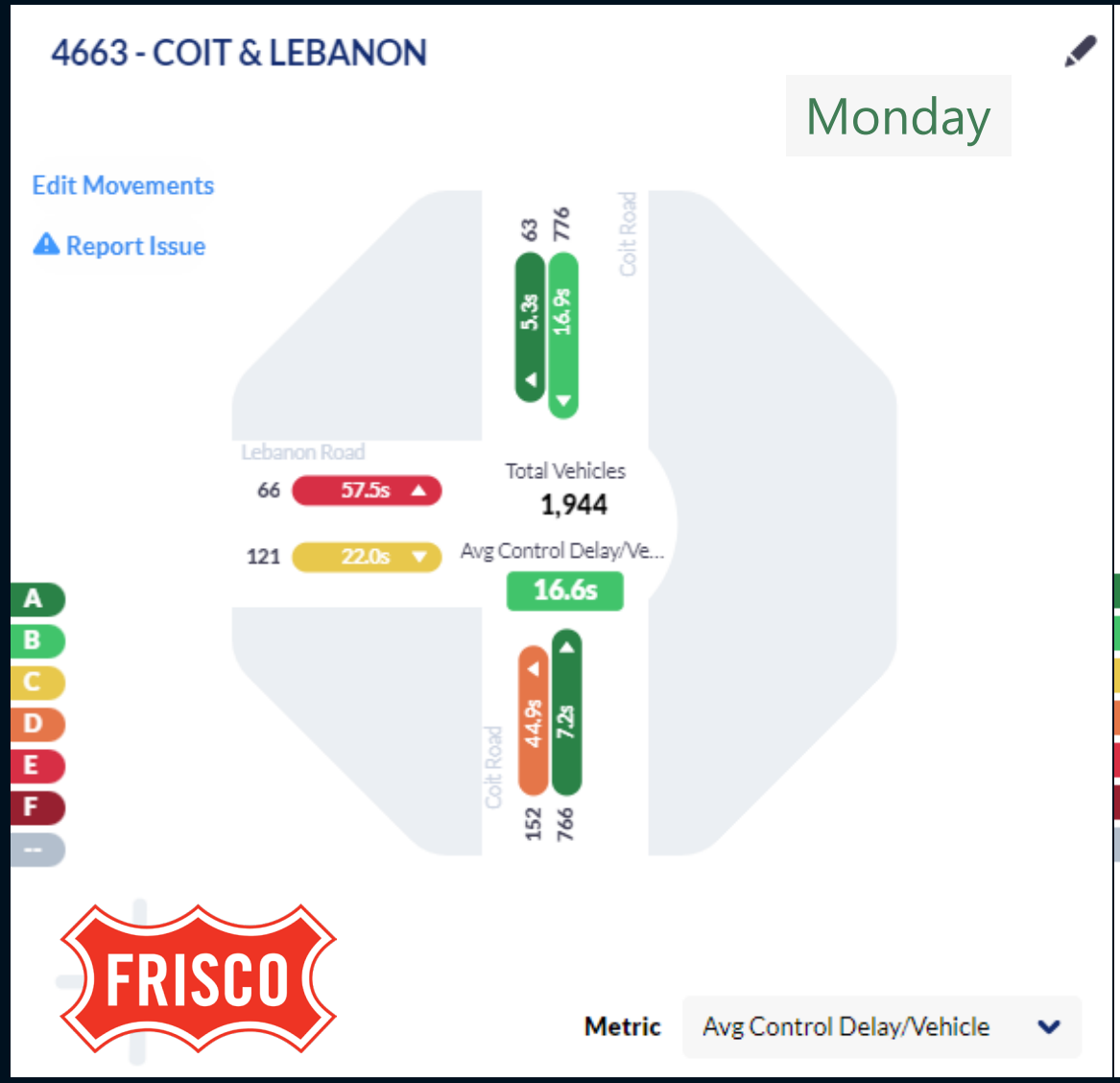
Worsened Control Delay (Total)	4-wk Avg	2024-09-10	Change	
1 Lebanon Road & Coit Road	9.6h B	23.5h D	+13.9h	+146%
2 Stonebrook Parkway & Preston Road	31.9h C	39.4h D	+7.6h	+24%
3 Dallas Parkway & Eldorado Parkway	35.6h C	40.3h D	+4.7h	+13%
4 Wade Boulevard & Preston Road	19.2h B	23.5h C	+4.2h	+22%
5 West Stonebrook Parkway & Farm-to-Market Road 423	43.6h D	47.6h D	+4.0h	+9%

Worsened Control Delay (per Vehicle)	4-wk Avg	2024-09-10	Change	
1 Lebanon Road & Coit Road	18s B	45s D	+26s	+146%
2 Lebanon Road & Hillcrest Road	25s C	33s C	+8s	+31%
3 Stonebrook Parkway & Preston Road	30s C	37s D	+7s	+24%
4 Dallas Parkway SB & Cotton Gin	30s C	37s D	+7s	+23%
5 Ohio Drive & Hillcrest Road	24s C	30s C	+5s	+22%

ATSPM Alerts for 9/11/2024

--The following signals have high pedestrian activation occurrences between 1:00 and 5:00:
460 - Dallas Pkwy & Lebabon - Phase 8 (78 Pedestrian Activations)
895 - Coit & Lebanon - Phase 8 (463 Pedestrian Activations)

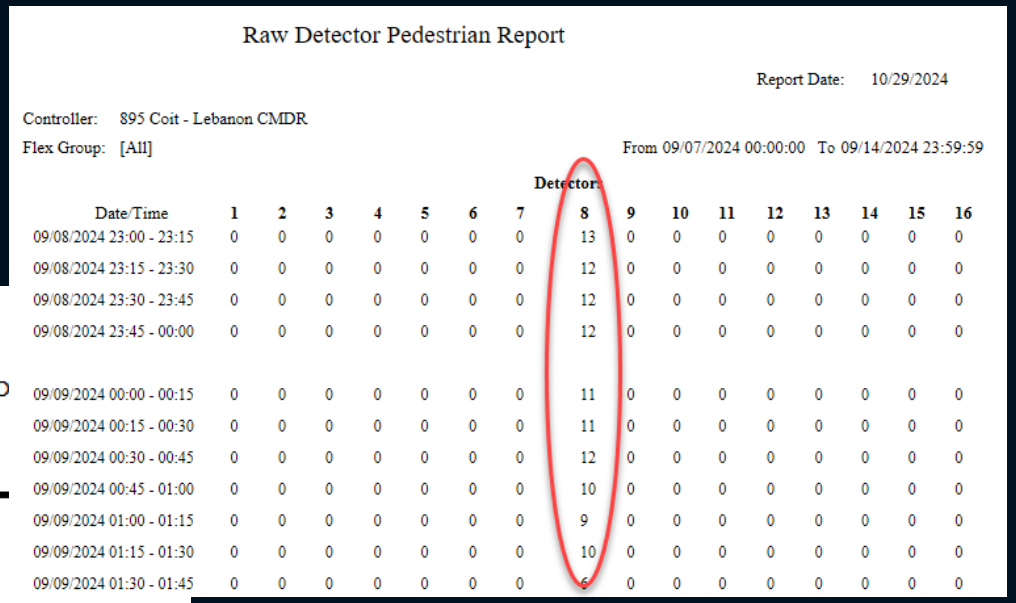
Example – Coit & Lebanon



Example – Coit & Lebanon

Mystery Problem

- INRIX showed same level of traffic – very different driver experience
  - Data differences points to stuck ped
- ATSPM watchdog – stuck ped
  - Traditional Pedestrian reports from the ATMS



Raw Detector Pedestrian Report

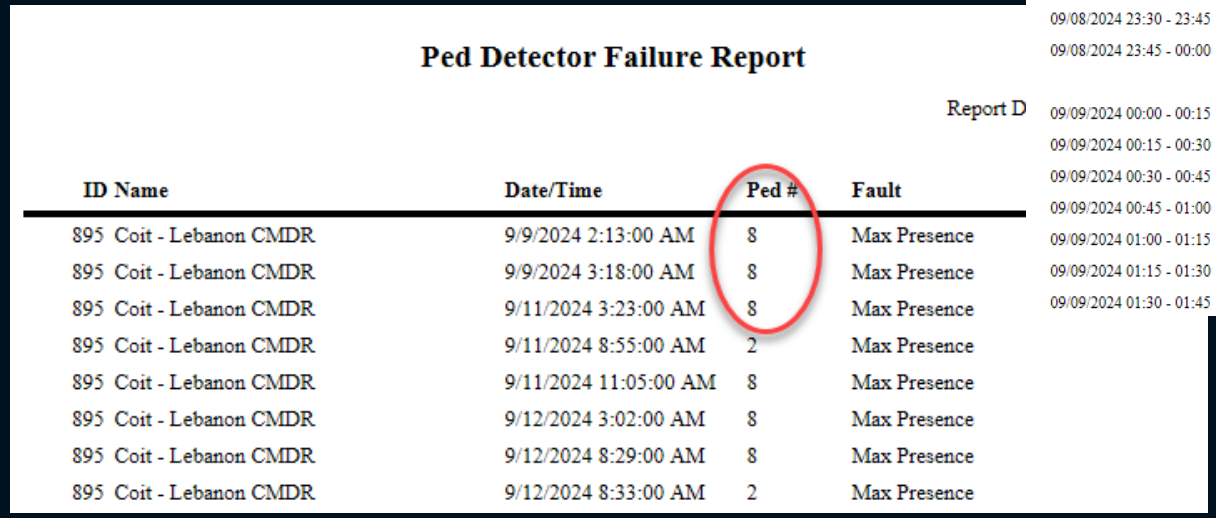
Report Date: 10/29/2024

Controller: 895 Coit - Lebanon CMDR

Flex Group: [All]

From 09/07/2024 00:00:00 To 09/14/2024 23:59:59

	Detector															
Date/Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
09/08/2024 23:00 - 23:15	0	0	0	0	0	0	0	13	0	0	0	0	0	0	0	0
09/08/2024 23:15 - 23:30	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0
09/08/2024 23:30 - 23:45	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0
09/08/2024 23:45 - 00:00	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0
09/09/2024 00:00 - 00:15	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0
09/09/2024 00:15 - 00:30	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0
09/09/2024 00:30 - 00:45	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	0
09/09/2024 00:45 - 01:00	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0
09/09/2024 01:00 - 01:15	0	0	0	0	0	0	0	9	0	0	0	0	0	0	0	0
09/09/2024 01:15 - 01:30	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	0
09/09/2024 01:30 - 01:45	0	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0

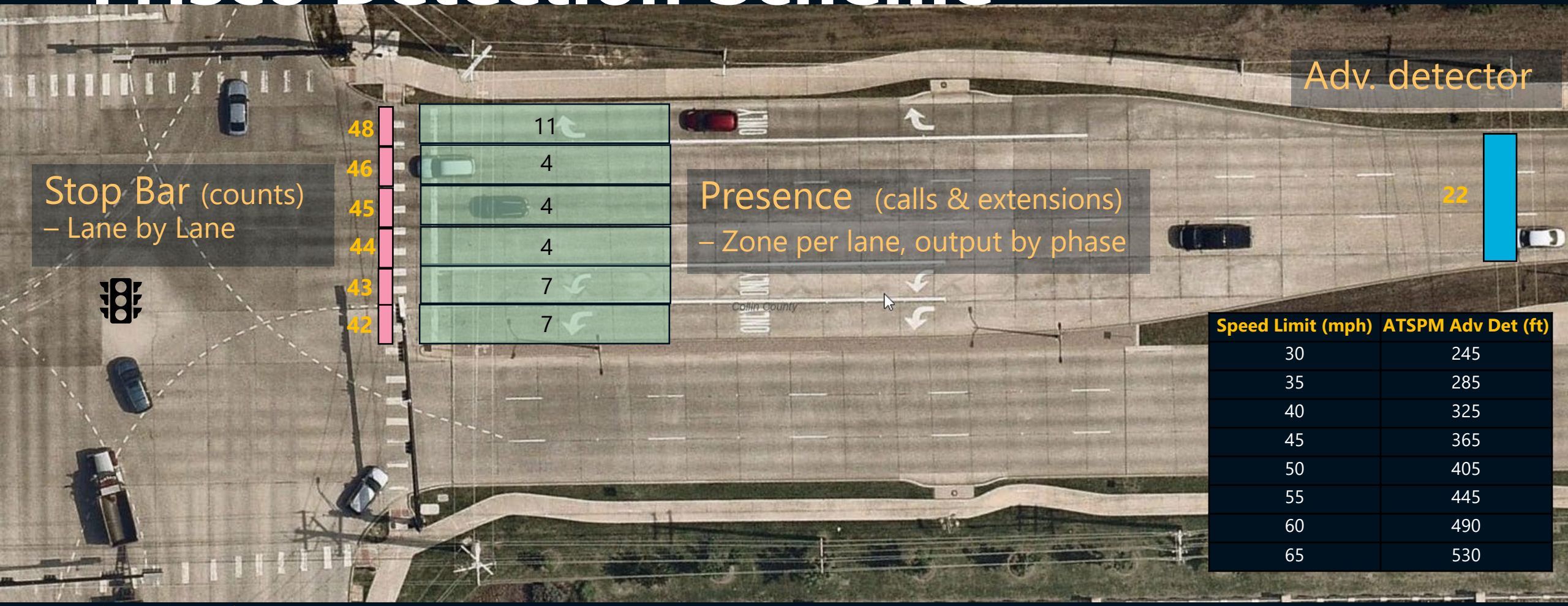


Ped Detector Failure Report

Report D

ID Name	Date/Time	Ped #	Fault
895 Coit - Lebanon CMDR	9/9/2024 2:13:00 AM	8	Max Presence
895 Coit - Lebanon CMDR	9/9/2024 3:18:00 AM	8	Max Presence
895 Coit - Lebanon CMDR	9/11/2024 3:23:00 AM	8	Max Presence
895 Coit - Lebanon CMDR	9/11/2024 8:55:00 AM	2	Max Presence
895 Coit - Lebanon CMDR	9/11/2024 11:05:00 AM	8	Max Presence
895 Coit - Lebanon CMDR	9/12/2024 3:02:00 AM	8	Max Presence
895 Coit - Lebanon CMDR	9/12/2024 8:29:00 AM	8	Max Presence
895 Coit - Lebanon CMDR	9/12/2024 8:33:00 AM	2	Max Presence

Frisco Detection Scheme



Speed Limit (mph)	ATSPM Adv Det (ft)
30	245
35	285
40	325
45	365
50	405
55	445
60	490
65	530

Proactive versus Reactive

Reactive

- Citizen Phone Calls
- Citizen emails
- My Frisco app - Cityworks

Proactive

- TMC System Checks
- ATSPM Watchdog Report
- INRIX Signal Analytics Performance Report

TMC System Checks

TMC/EOC

- Staffed 6 AM to 7 PM M - F

Weekly System Checks (Mon & Tues)

- Communications
- ATMS – Upload & Compare
- Cameras
- Radar Detection
- UPS
- School Flashers
- Portable Message Boards

ATSPM Watchdog Report

ATSPM Watchdog Report

- Email at 6 AM each morning
- Signals with:
  - Too few records (comm or controller)
  - Too many force offs 1 – 5 AM
  - Too many max outs 1 – 5 AM
  - Unusually low adv. detections 6 – 10 PM
  - High ped activity 1 – 5 AM
- New features coming Ver 5

CAUTION: External Email.

--The following signals had too few records in the database on 10/17/2024:
116 - Walmart & Eldorado (Missing Records - IP: 10.103.1.15)
1192 - Eldorado & Dickson CMDR (Missing Records - IP: 10.26.96.142)
178 - Babbling Brook & Stonebrook PHB (Missing Records - IP: 10.104.3.203)
266 - Legacy & Veneto (Missing Records - IP: 10.103.4.127)
292 - Legacy & Stonebriar (Missing Records - IP: 10.26.96.58)
345 - Frisco Green & John Hickman (Missing Records - IP: 10.101.0.76)
663 - Preston & Hickory (Missing Records - IP: 10.105.0.127)
868 - Coit & Hardy (Missing Records - IP: 10.102.1.178)
869 - Coit & Jacksboro PHB (Missing Records - IP: 10.102.1.78)

--No new force off errors were found between 1:00 and 5:00:

--The following signals had too many max out occurrences between 1:00 and 5:00:
185 - 4th Army & Stonebrook - Phase 2 (Max Outs 100%)
185 - 4th Army & Stonebrook - Phase 6 (Max Outs 100%)
20 - FM 423 & US 380 - Phase 2 (Max Outs 92.1%)
20 - FM 423 & US 380 - Phase 5 (Max Outs 100%)
728 - Ohio & Stone Crest - Phase 4 (Max Outs 97.2%)
810 - Hillcrest & Lebanon - Phase 2 (Max Outs 100%)
810 - Hillcrest & Lebanon - Phase 4 (Max Outs 99.2%)
810 - Hillcrest & Lebanon - Phase 6 (Max Outs 100%)
810 - Hillcrest & Lebanon - Phase 8 (Max Outs 100%)

--The following signals had unusually low advanced detection counts on 10/17/2024 between 18:00 and 20:00:
118 - Grayhawk & Eldorado - Phase 4 (CH: 22 - Count: 0)
118 - Grayhawk & Eldorado - Phase 5 (CH: 18 - Count: 0)
118 - Grayhawk & Eldorado - Phase 8 (CH: 30 - Count: 0)
123 - The Trails & Main - Phase 4 (CH: 22 - Count: 0)
123 - The Trails & Main - Phase 8 (CH: 30 - Count: 0)
135 - Championship & US 380 - Phase 2 (CH: 18 - Count: 0)

INRIX Signal Analytics Performance Report

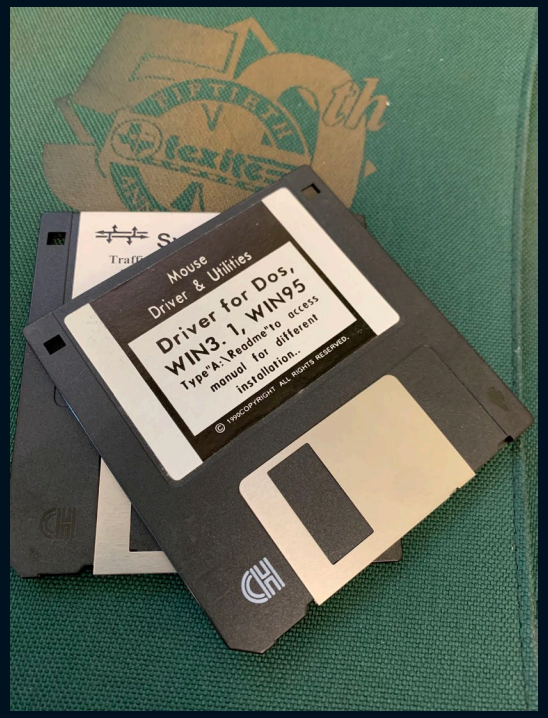
INRIX Signal Analytics

- Email at 2 PM each afternoon
- Compares Control Delay
  - 4 wk average v last 24 hours
- Why is that signal on the list?
  - Construction?
  - Special Event?
  - Something broken?

Intersections: Top 5 Control Delay Issues		2024-10-08	24 Hrs		
Worsened Control Delay (Total)		**4-wk Avg**	**2024-10-08**		**Change**
1	6593 - COIT ROAD & PGA/VIRGINIA PARKWAY	14.8h C	17.7h C	+2.8h	+19%
2	Lakehill Boulevard & Legacy Drive	5.5h A	8.3h B	+2.8h	+50%
3	Dallas Parkway & Gaylord Parkway	12.7h C	14.9h D	+2.2h	+18%
4	Lebanon Road & Hillcrest Road	10.5h C	12.4h C	+2.0h	+19%
5	Main Street & South County Road	7.0h C	8.4h C	+1.4h	+21%
Worsened Control Delay (per Vehicle)		**4-wk Avg**	**2024-10-08**		**Change**
1	6593 - COIT ROAD & PGA/VIRGINIA PARKWAY	29s C	34s C	+5s	+19%
2	Lebanon Road & Hillcrest Road	29s C	35s C	+5s	+19%
3	Dallas Parkway & Gaylord Parkway	30s C	35s D	+5s	+18%
4	Main Street & South County Road	25s C	30s C	+5s	+21%
5	Lakehill Boulevard & Legacy Drive	7s A	10s B	+3s	+50%

Proactive Challenge

Can we find something with our new tools faster than a citizen armed with their phone?



>

FRISCO

Thank you!

Kirk Houser. P.E.
khouser@friscotexas.gov

Signal analytics 10/29 call

Ritis access – reach out to signal-support@ritis.org

- Ritis has 3 minute tool also
- Add signals to open street map – look at signal report card tab

Transportation Quality of Life

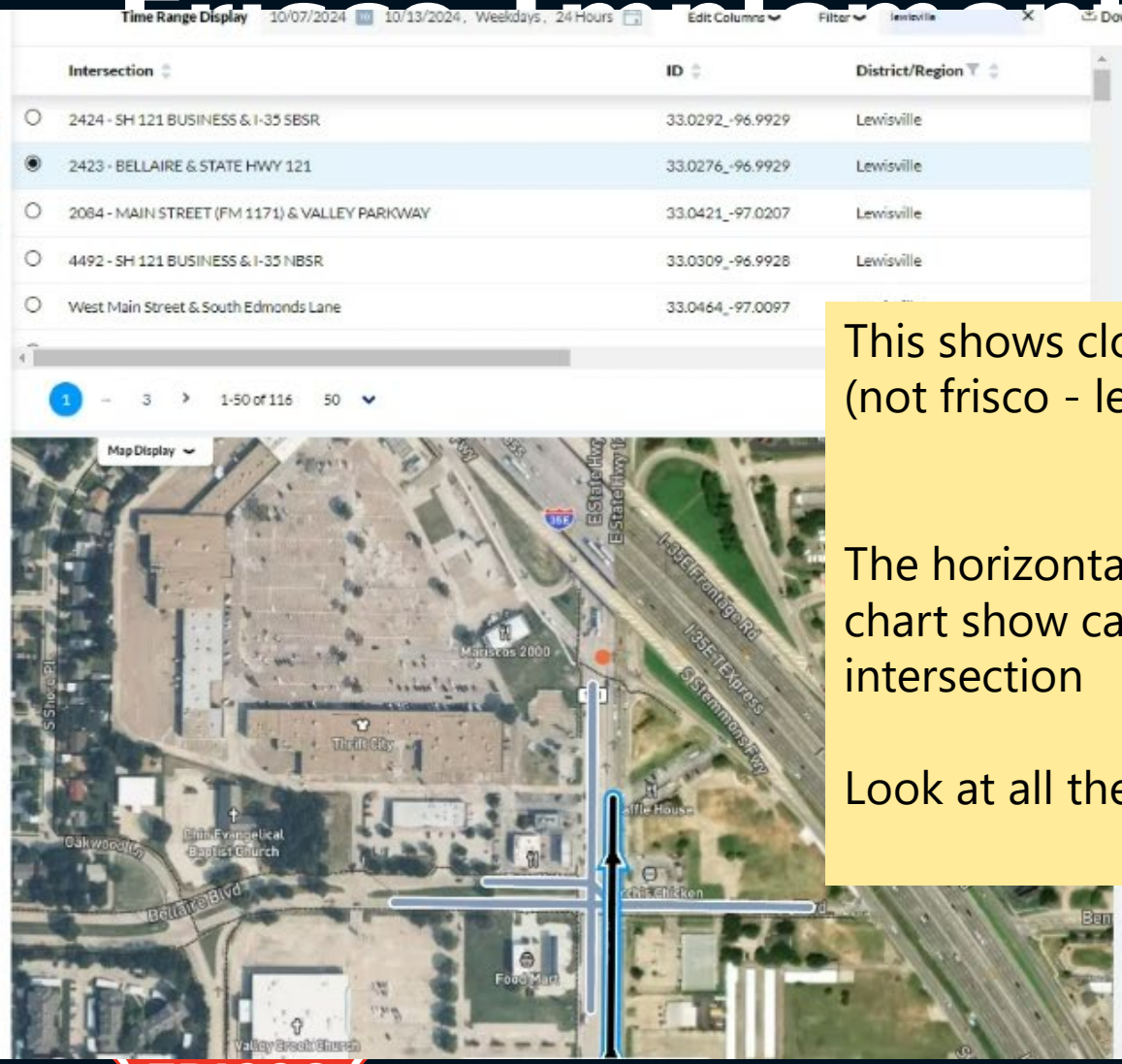
Safety

- Get there safely

Efficiency

- Get there without frustration
  - Green to Green Progression along arterials
  - Minor movements clear on first cycle

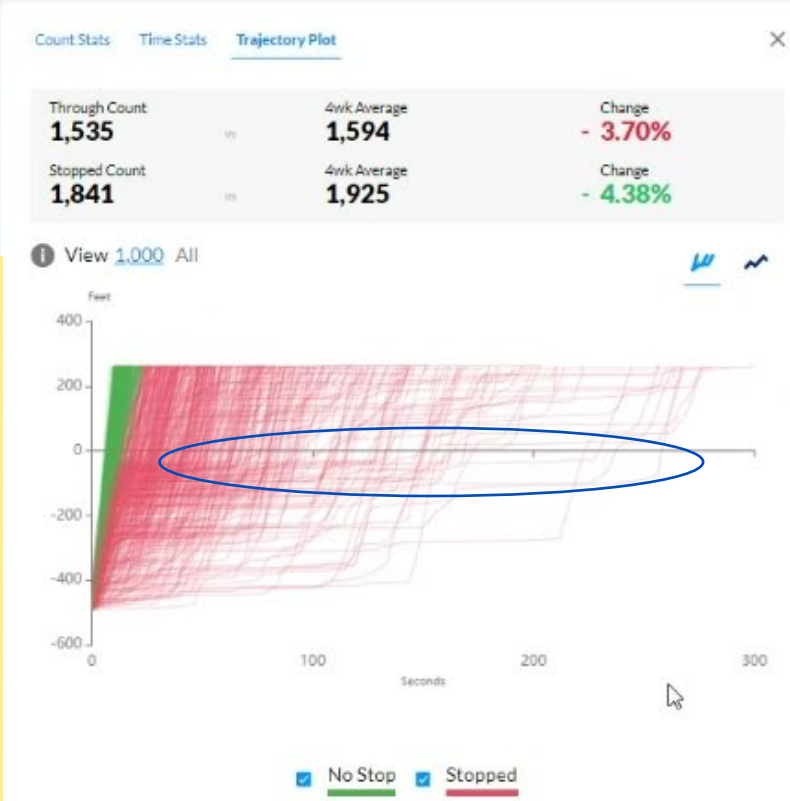
Frisco Implementation



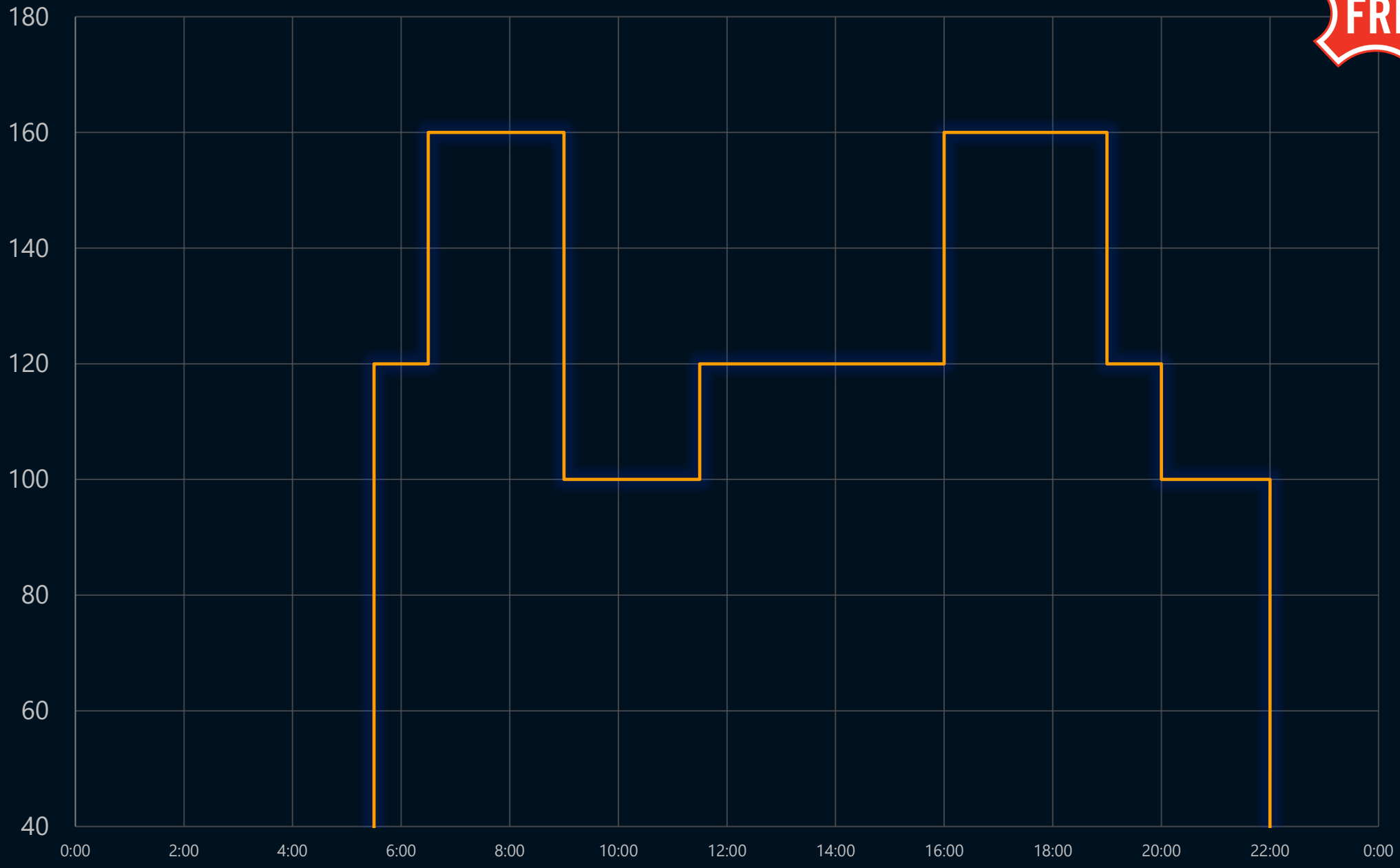
This shows closely spaced intersections (not frisco - lewisville)

The horizontal lines near “0” on the chart show cars stopped inside the intersection

Look at all the 121 intersections



Frisco Time of Day Schedule



Ex 1 Coit & Panther Creek

Service Request:

Add Left Turn Arrow NB

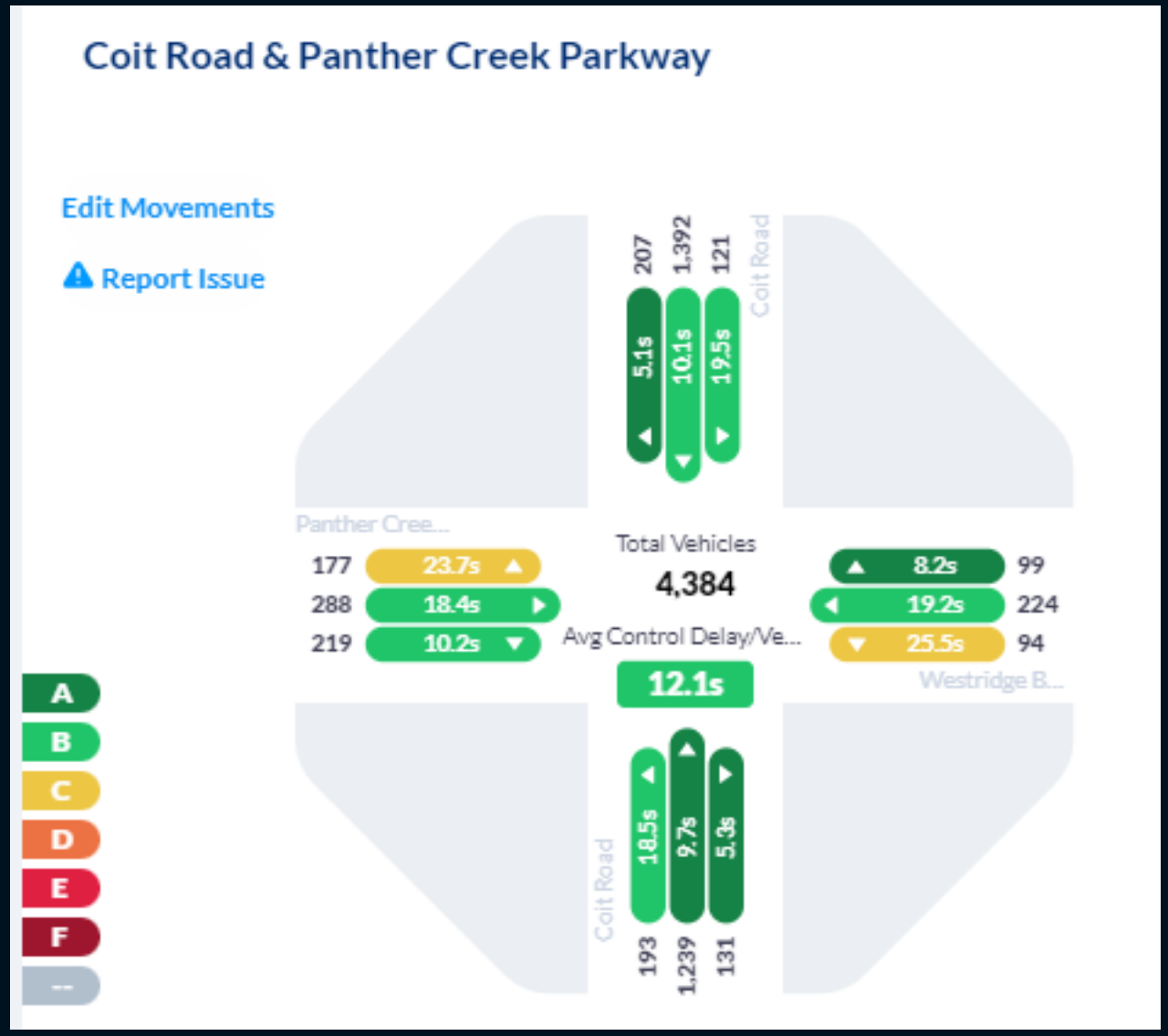
Currently:

Signal runs free.

FYA all approaches.

Left turn protected arrows active during AM & PM peak only.

Ex 1 Coit & Panther Creek



Before

March 2024

Control Delay per Vehicle

Ex 1 Coit & Panther Creek

Left Turn Crashes
2021 - 2023

9/26/2023 8:19 AM NBL v SBT PDO

Ex 2 Legacy & Veneto

Service Request:

Swap EB lane designations and/or add EB AM time

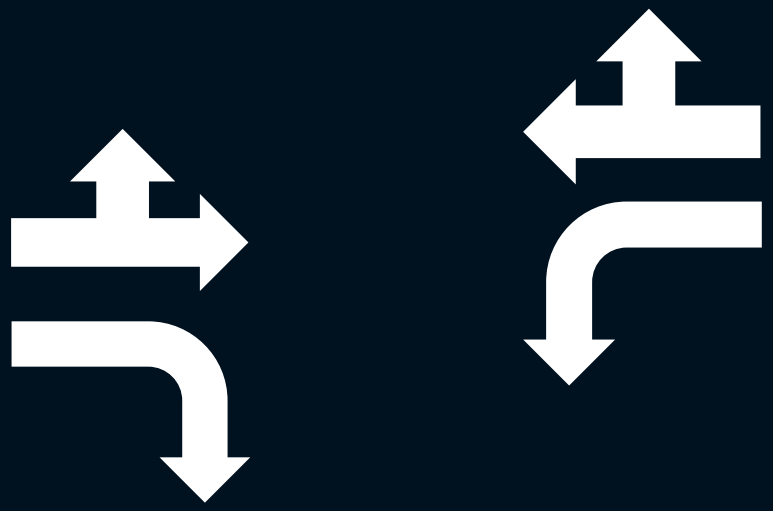
Currently:

Legacy in Coord

EB/WB both left, thru right

FYA all day for EB/WB

Ex 2 Legacy & Veneto



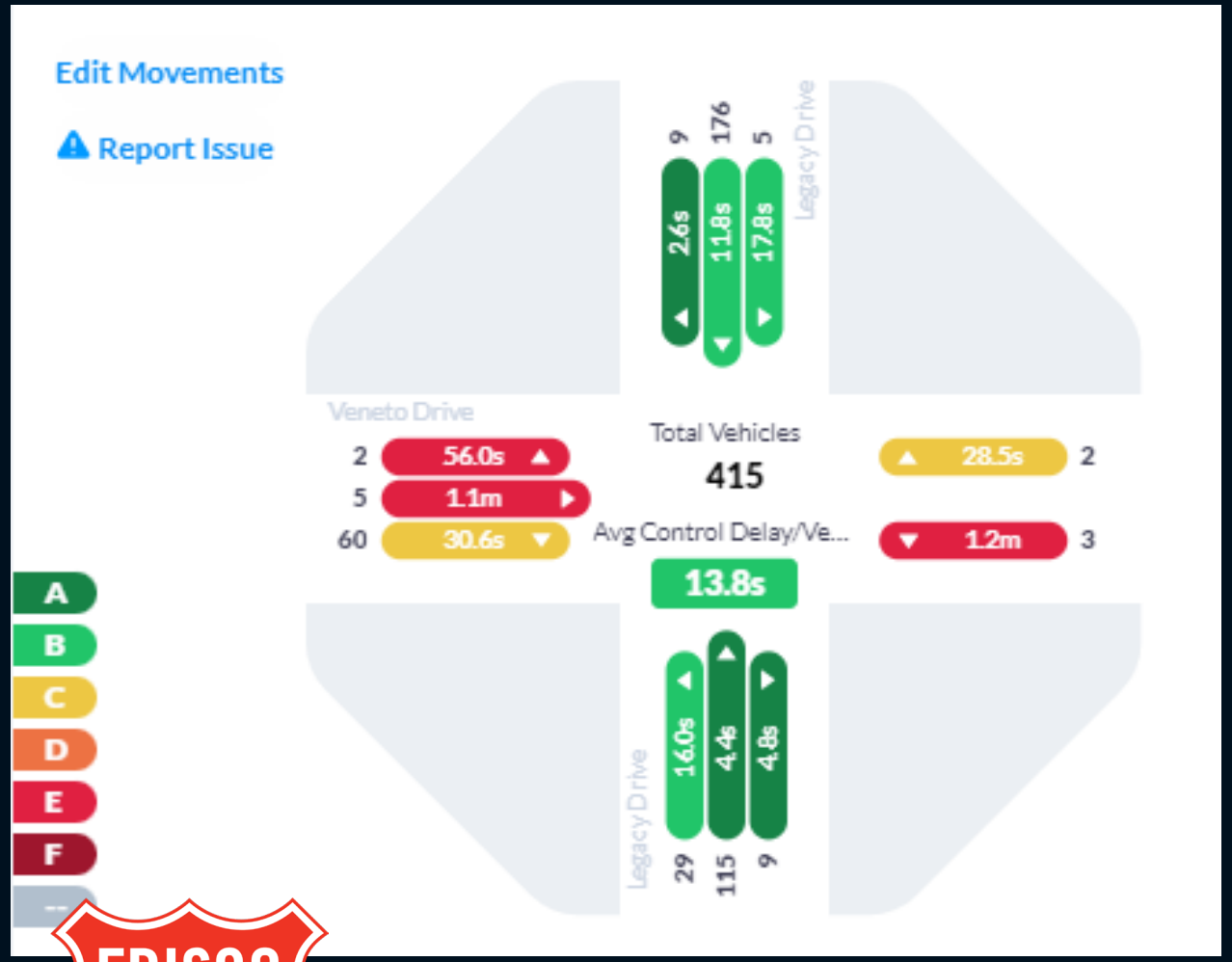
Service Request:

Swap EB lane designations and/or add EB AM time

Goal

Goal reduce side street delay without undue harm to Legacy.

Ex 2 Legacy & Veneto

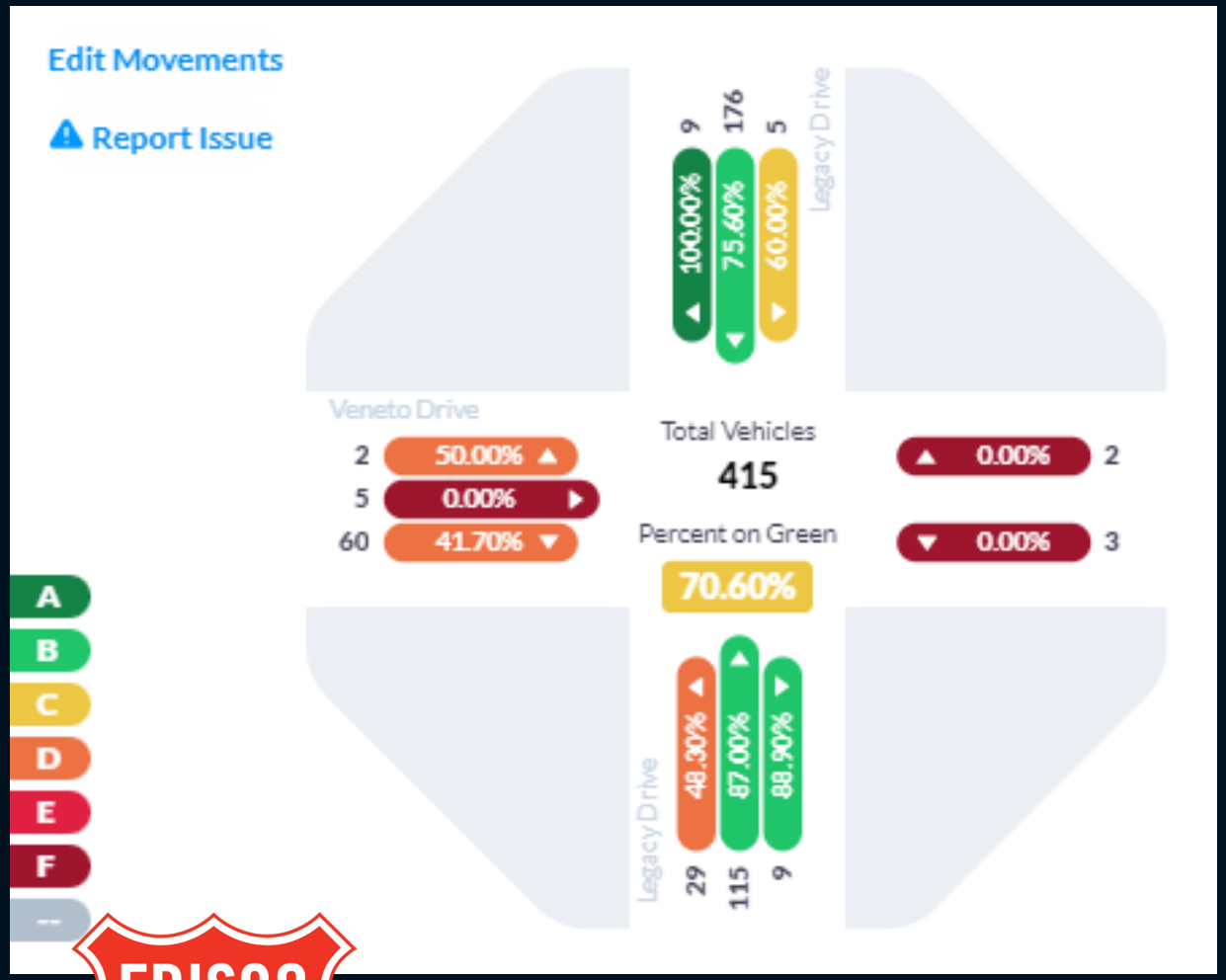


INRIX Signal Analytics

Before

AM – weekday 4/1/24-4/7/24
Delay / vehicle

Ex 2 Legacy & Veneto

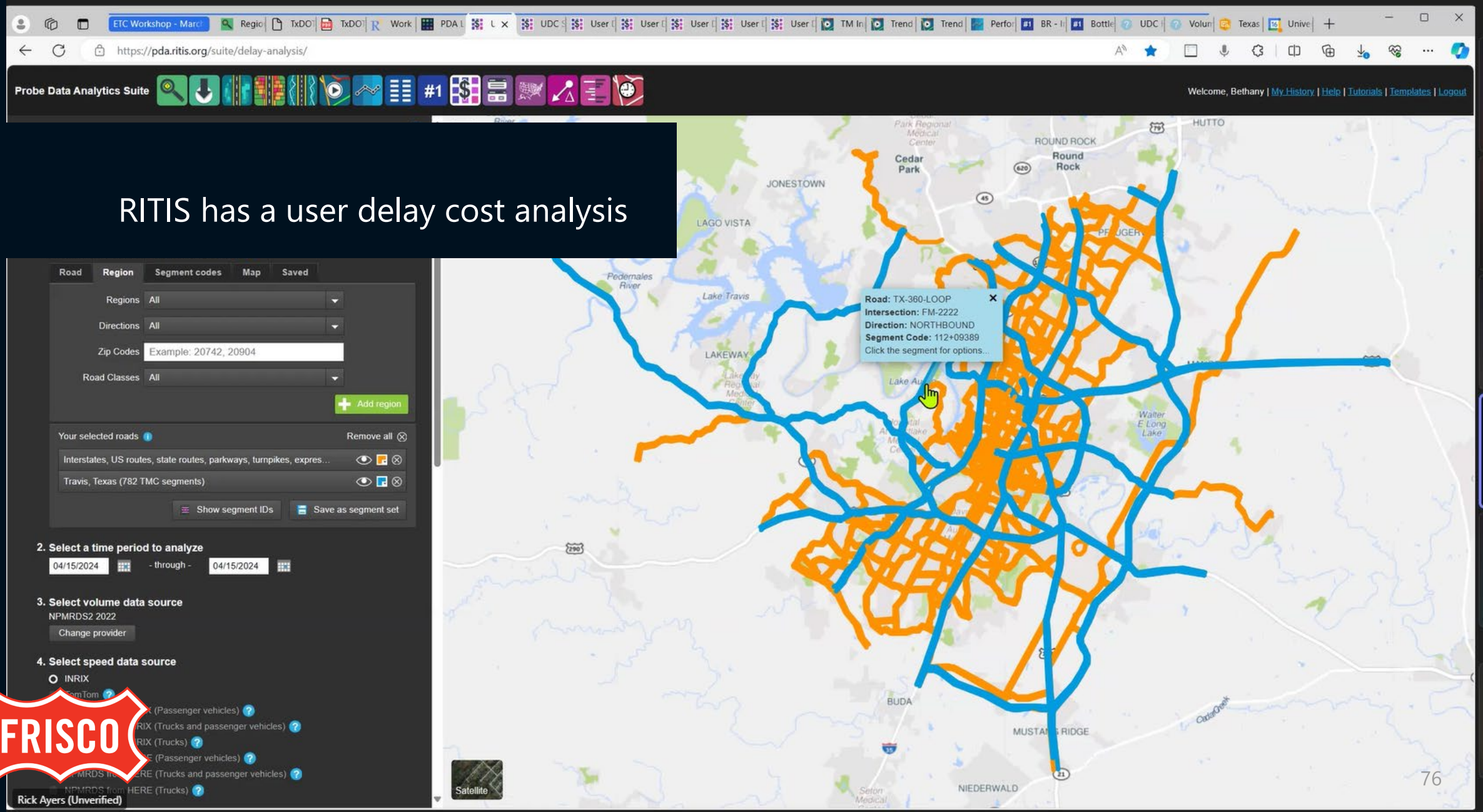


INRIX Signal Analytics

Before

AM – weekday 4/1/24-4/7/24
Arrivals on Green

RITIS has a user delay cost analysis



Ex 3 Teel & The Trails

Service Request:

Reported large EB Left backup between 8:30 AM and 8:50 AM

Currently:

Nearby school

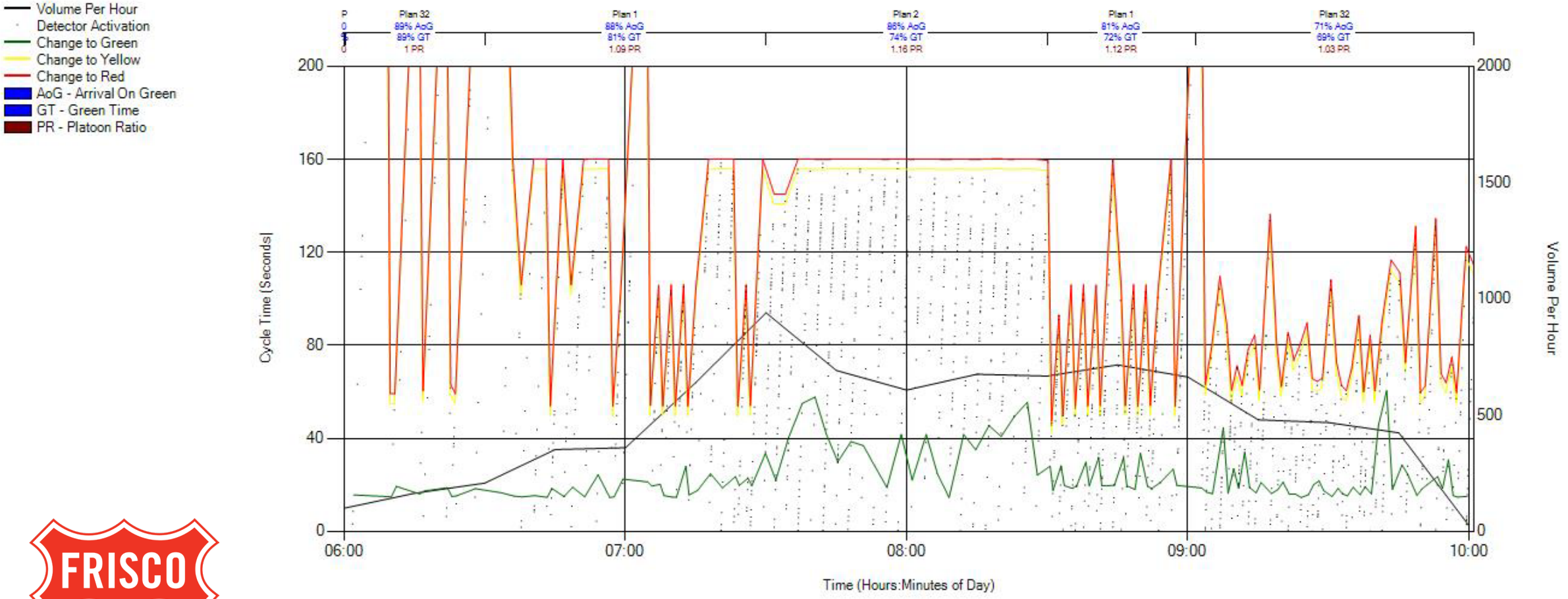
Special school timing

Purdue Coordination Diagram

Teel @ The Trails - SIG#158
Wednesday, April 3, 2024 6:00 AM - Wednesday, April 3, 2024 10:01 AM
Advanced detector located 325 ft. upstream of stop bar

Overlap 2: SBT Ph 2

AoG = 82%

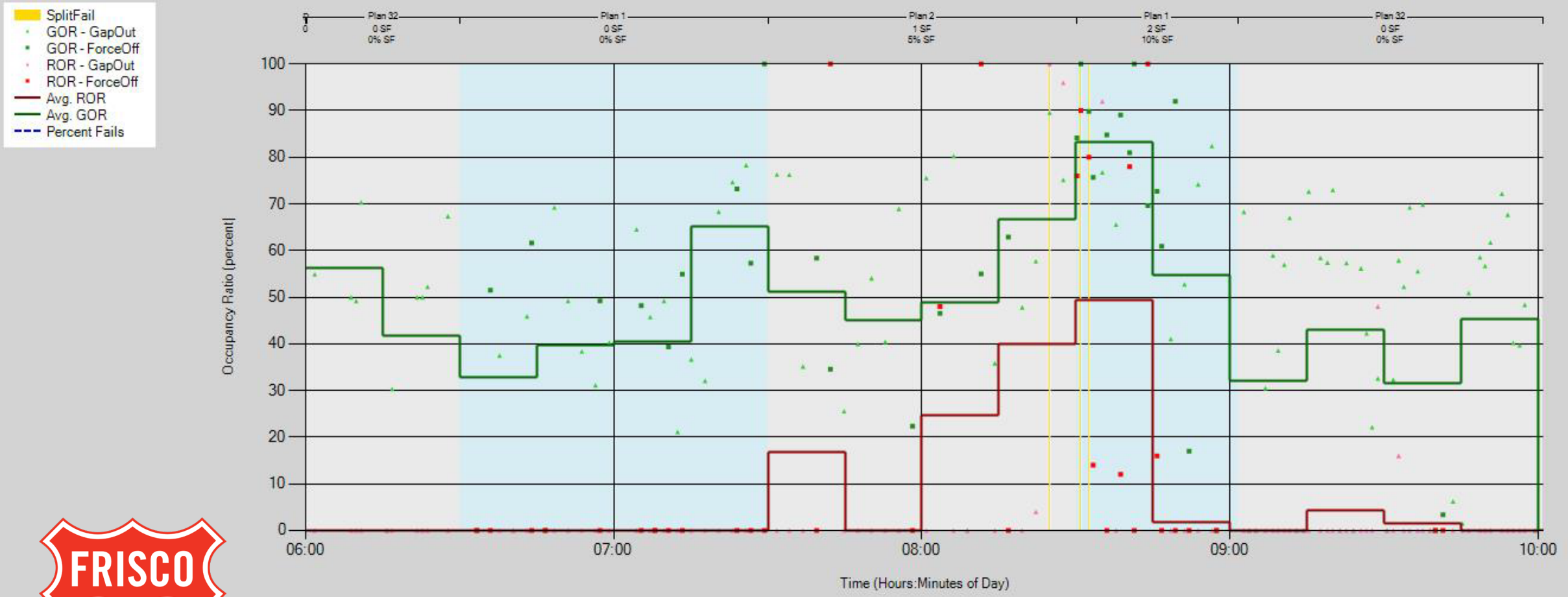


Purdue Split Failure

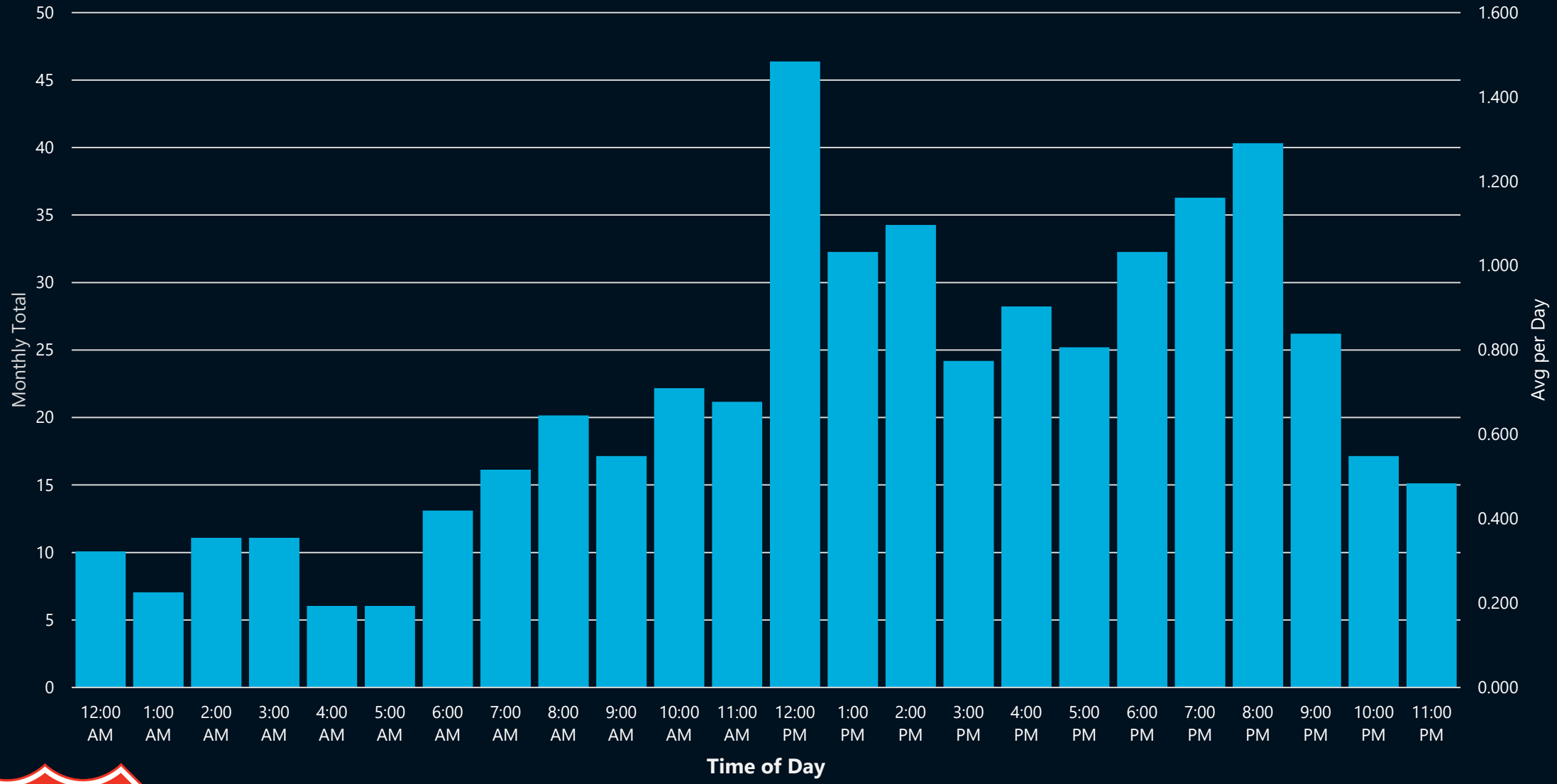
Teel @ The Trails - SIG#158
Wednesday, April 3, 2024 6:00 AM - Wednesday, April 3, 2024 10:01 AM

Overlap 8: EBL Ph 8

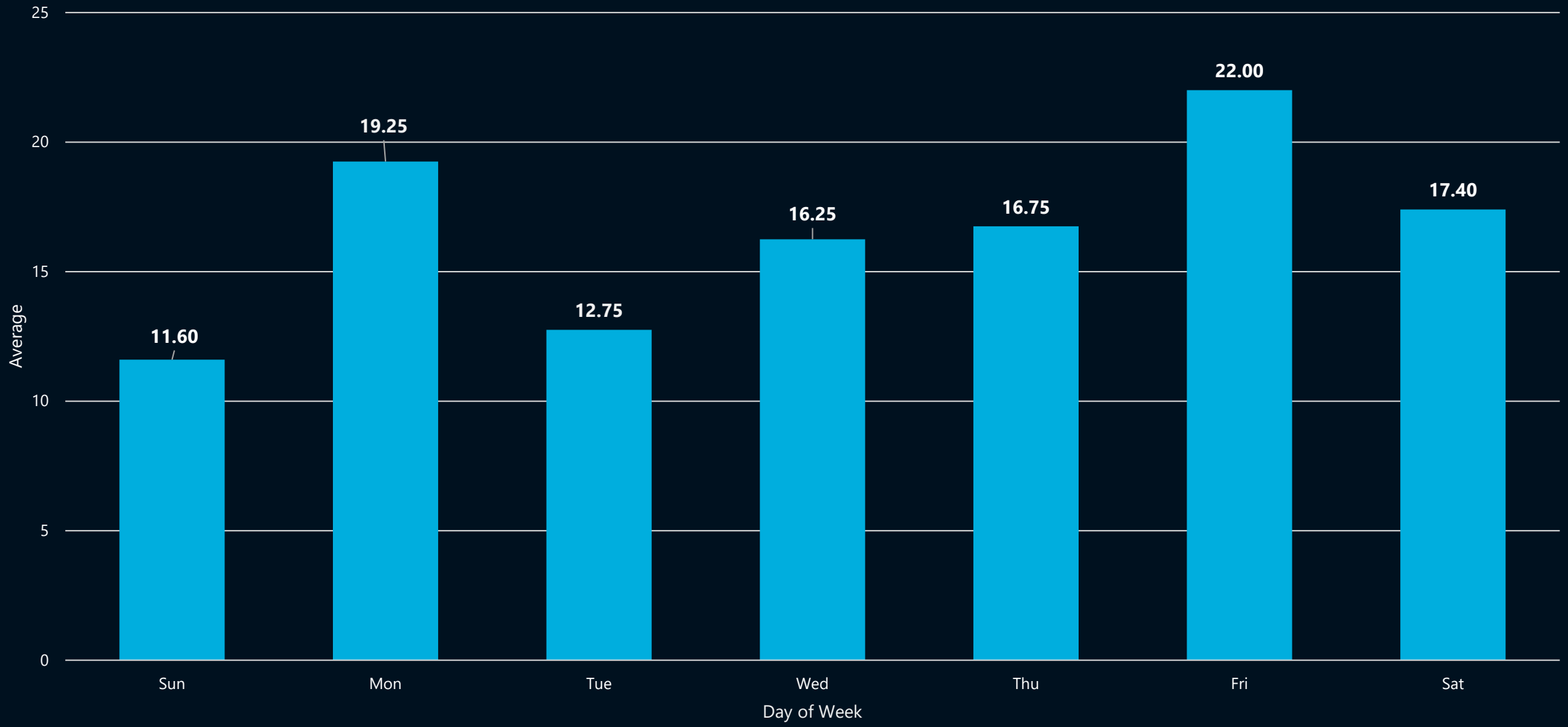
Total Split Failures = 3



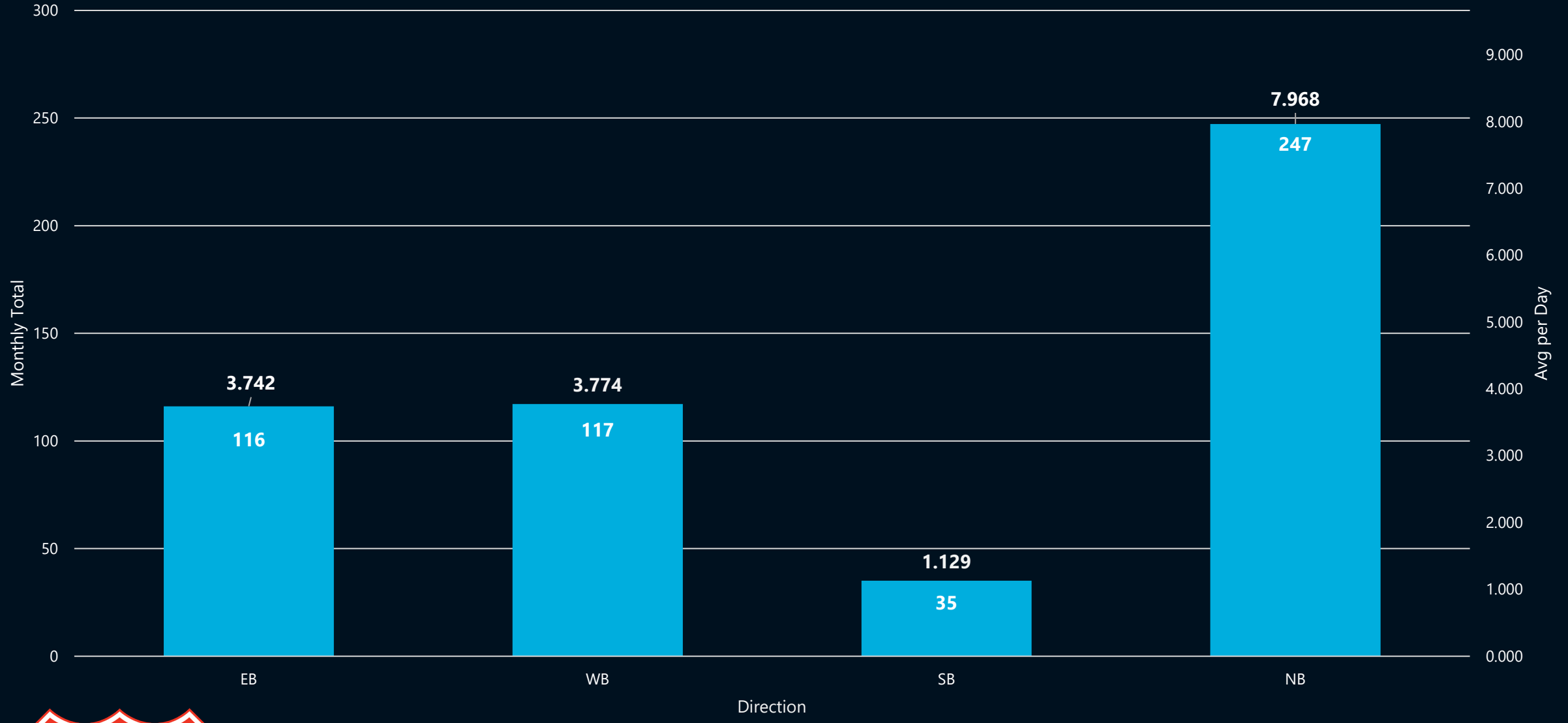
DNT & Main - Preemptions - March 2024



DNT & Main - Preemptions - March 2024

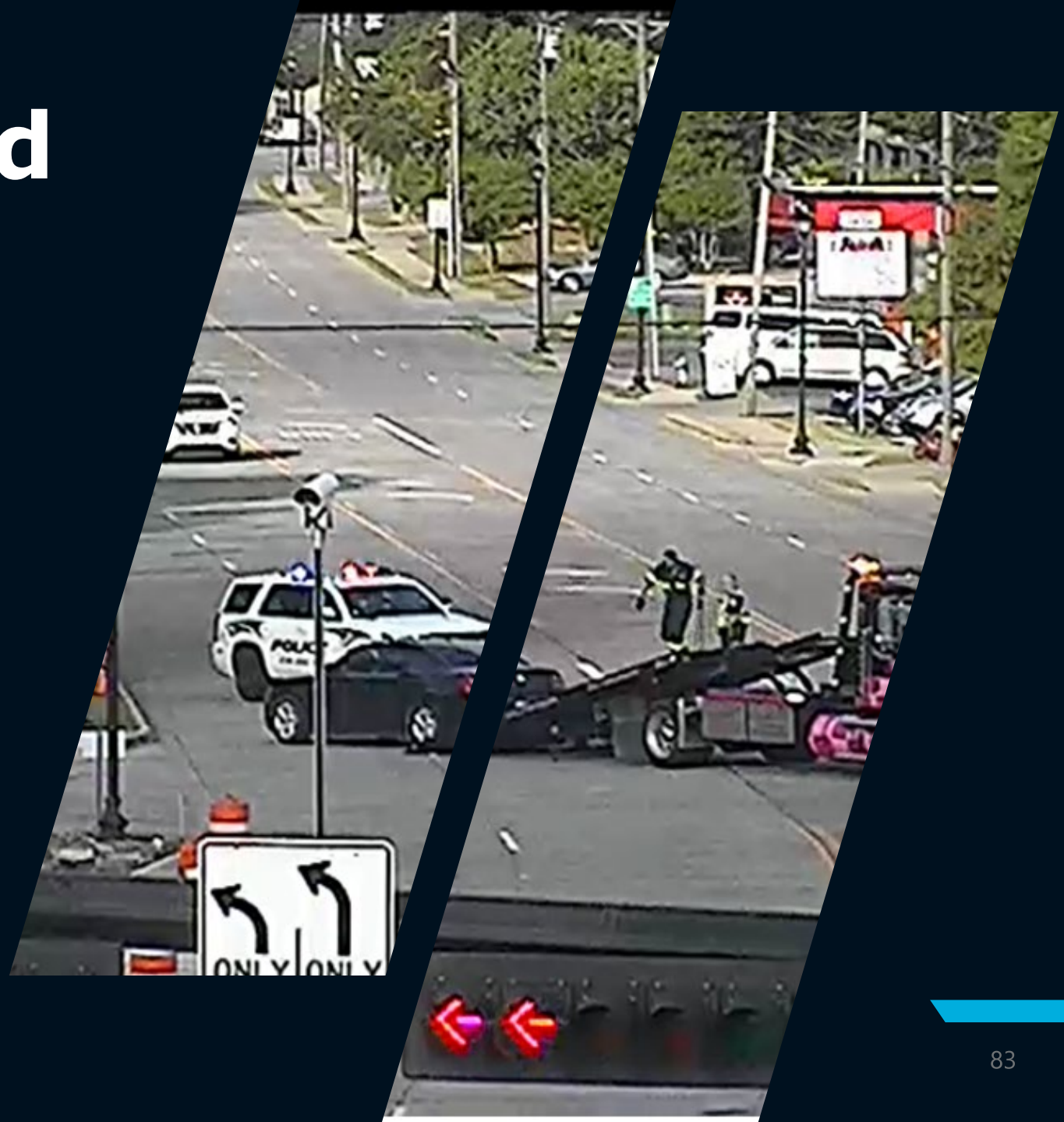


DNT & Main - Preemptions - March 2024



Lessons Learned

- blank
- Next Steps
  - blank



Purpose of Study

Scenario	Static Values			Adaptive		
	Cycle Length	Offset	Split	Cycle Length	Offset	Split
Neotraditional	✓	✓	✓			
SynchroGreen - Full Adaptive (current)				✓	✓	✓
SynchroGreen - Splits Only	✓	✓				✓
ITC City - Suggested Splits	✓	✓	✓			