The Road Ahead

Maine Signals At Work

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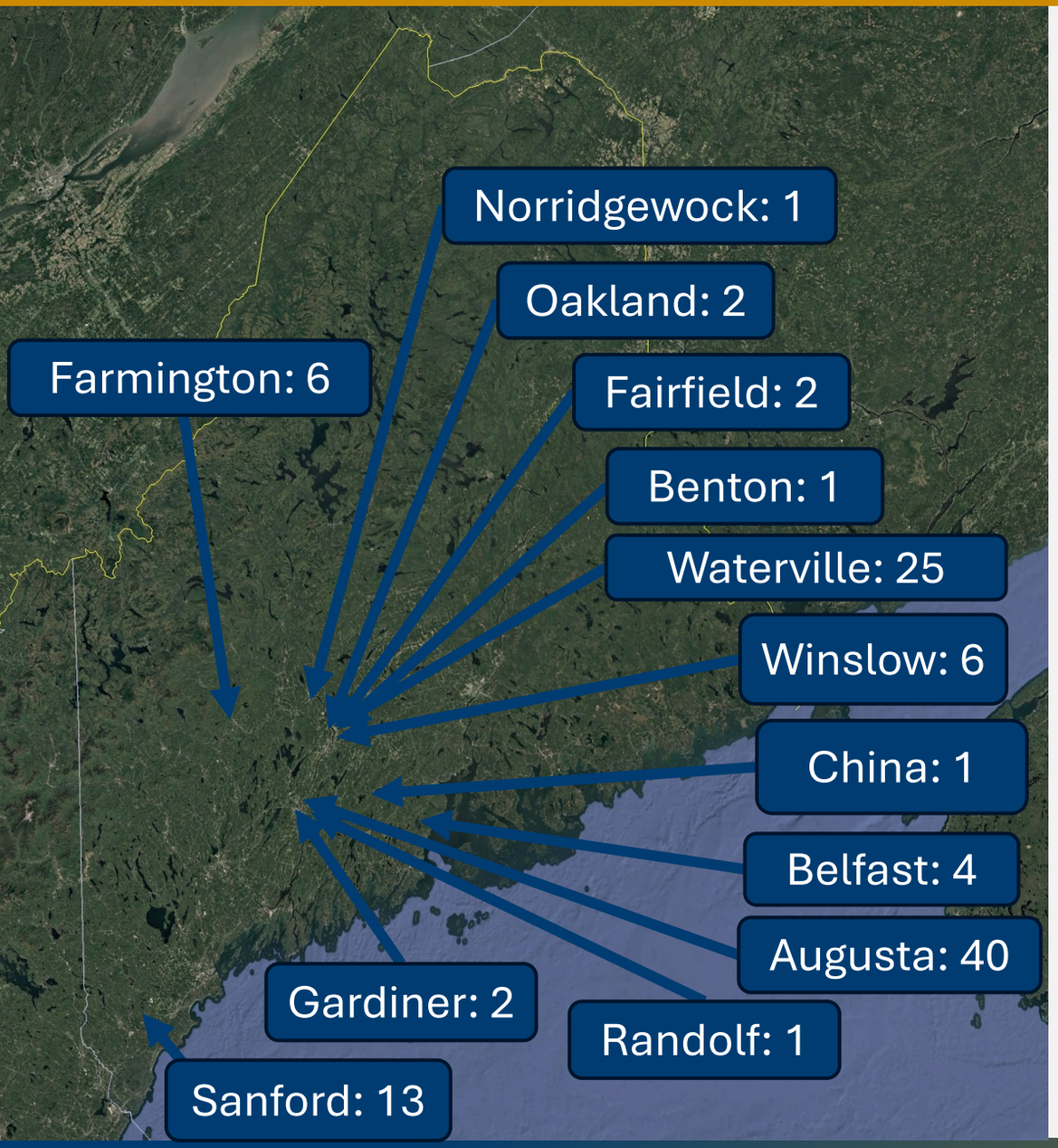
The Road Ahead, Maine Signals at Work

- Overview of Build Grant, ATCMTD Grant, and other Signal Projects
- Influences on Traffic Signal Design on Future Projects
- Impacts to Contractors and Constructability
- Updates to MaineDOT Standards and Policies
- Question and Answer



Statewide Build Grant

- 104 Intersections
- 12 Municipalities
- ATC Technology
- ADA Improvements
- Detection Upgrades
- Central Management System

ATCMTD Grant

- 43 Intersections
- 33 Municipalities
- ATC Controllers
- Detection Upgrades
- Central Management System

Other Projects

ATC Pilot: 9

MaineDOT Projects: 16

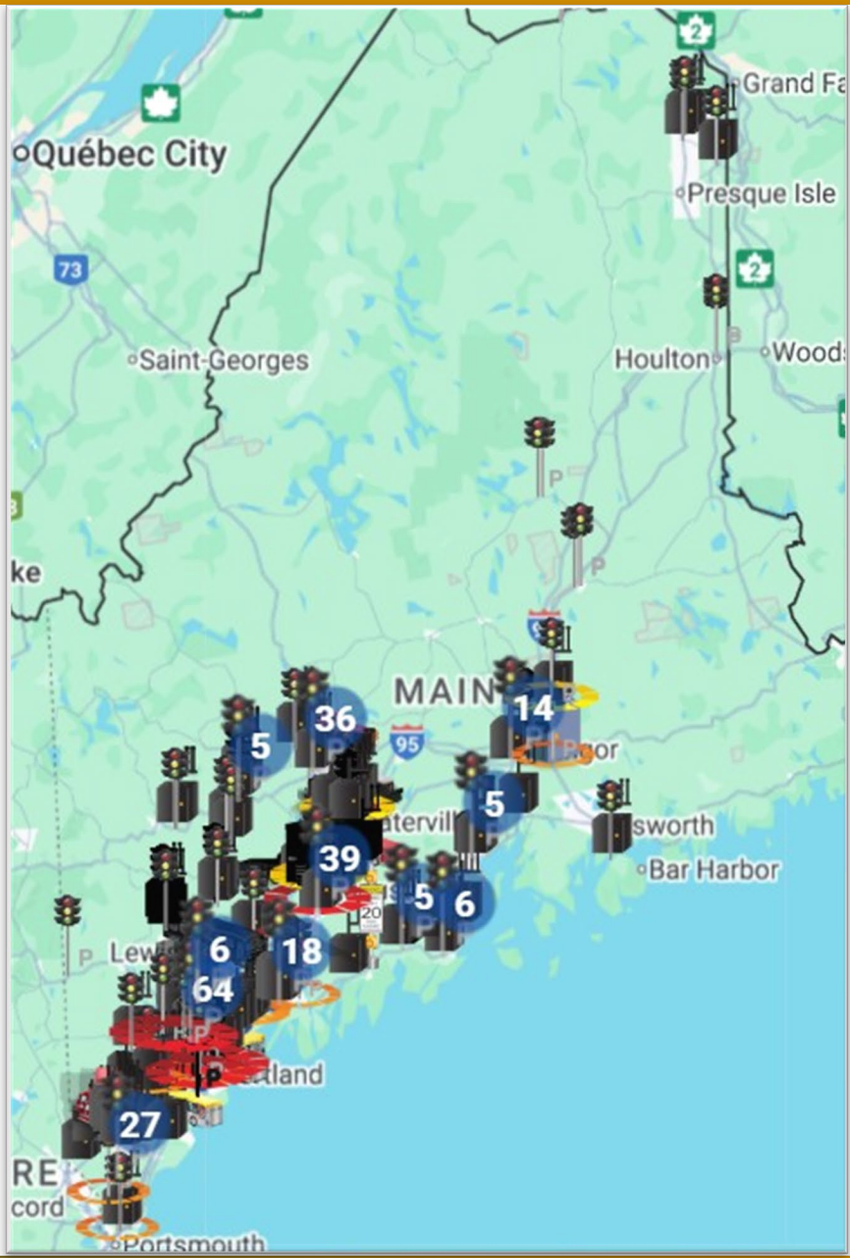
Waterville Build Grant: 2

Development Projects: 19

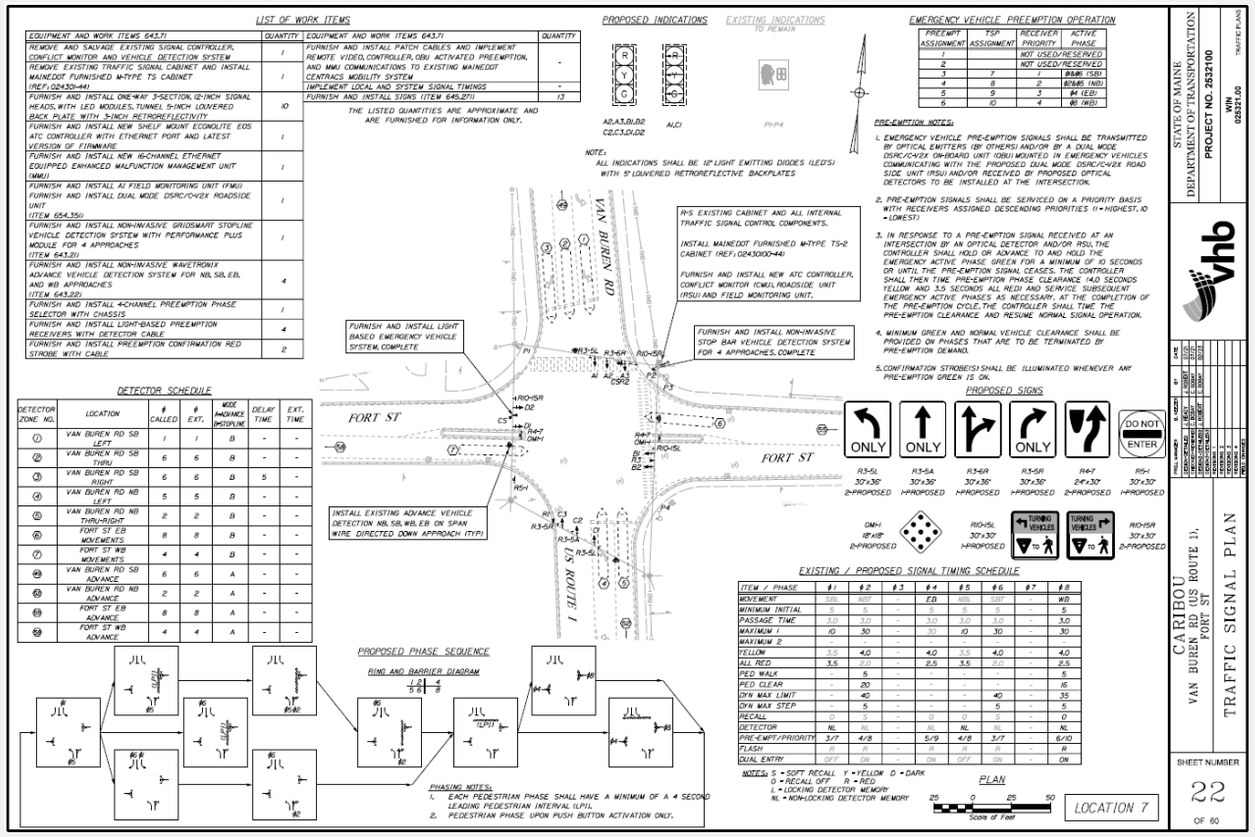
Municipal Projects: 47

MaineDOT Managed: 167

Total Connected: 254



BUILD Influence on Traffic Signal Design



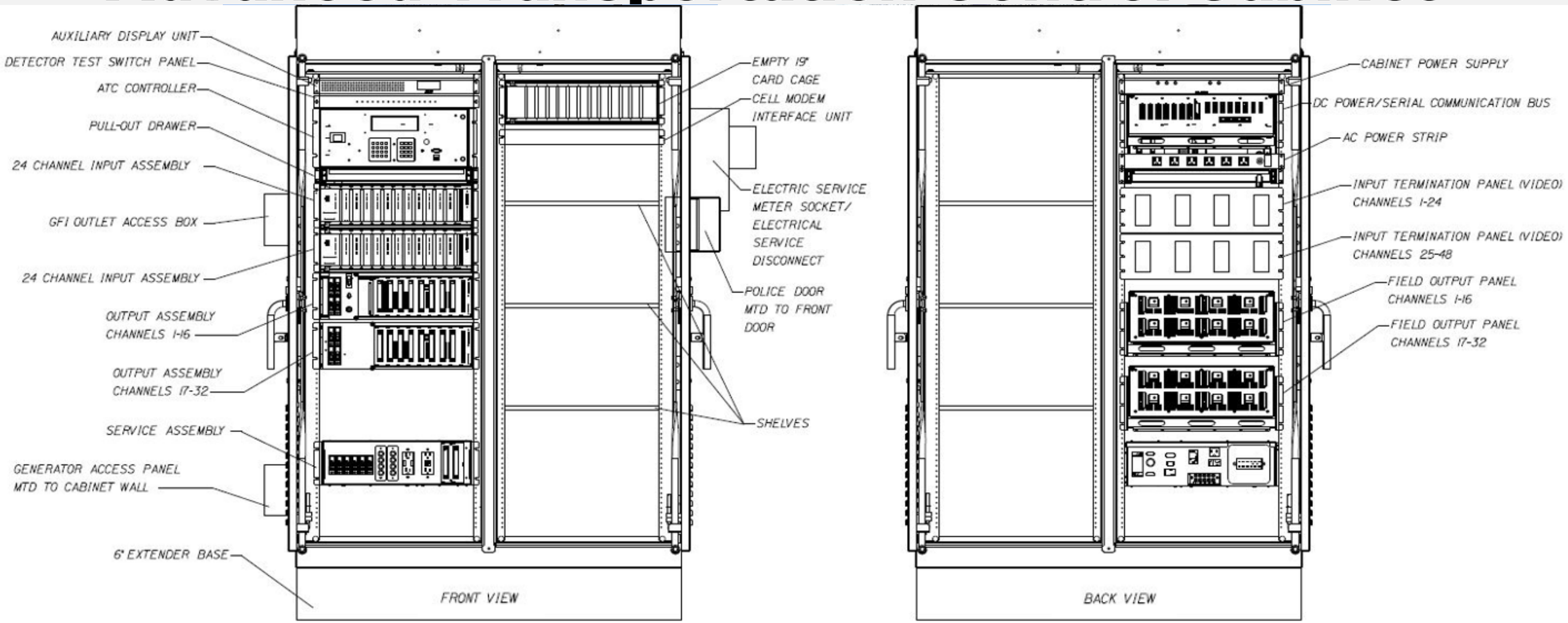
- Advanced Transportation Control Cabinet (ATCC)
- Leading Pedestrian Intervals (LPI)
- Flashing Yellow Arrows (FYA)
- Advance(d) Detection
- Adaptive Traffic Signal Control (ATSC)

Advanced Transportation Control Cabinet (ATCC)

Advanced Transportation Control Cabinet

- ✓Flexibility within the standard for innovative designs
- ✓ Higher density – More capability in a smaller space
- ✓ Increased technician safety eliminating arc flash per NFPA 70E.
- ✓Enhanced monitoring functionality
- ✓ Increased cabinet power efficiency
- ✓ Enhanced LED compatibility
- ✓Allow for modular assemblies to be replaceable while the intersection remains on flash.

Advanced Transportation Control Cabinet



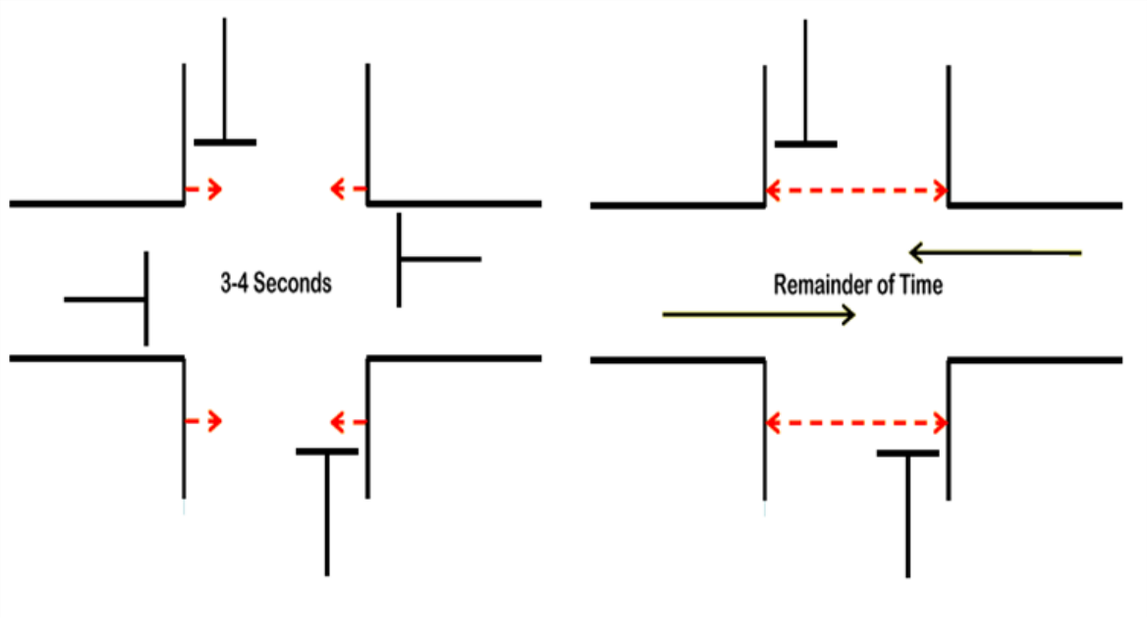
Advanced Transportation Control Cabinet

Leading Pedestrian Intervals (LPIs)

Source: FHWA-SA-21-032

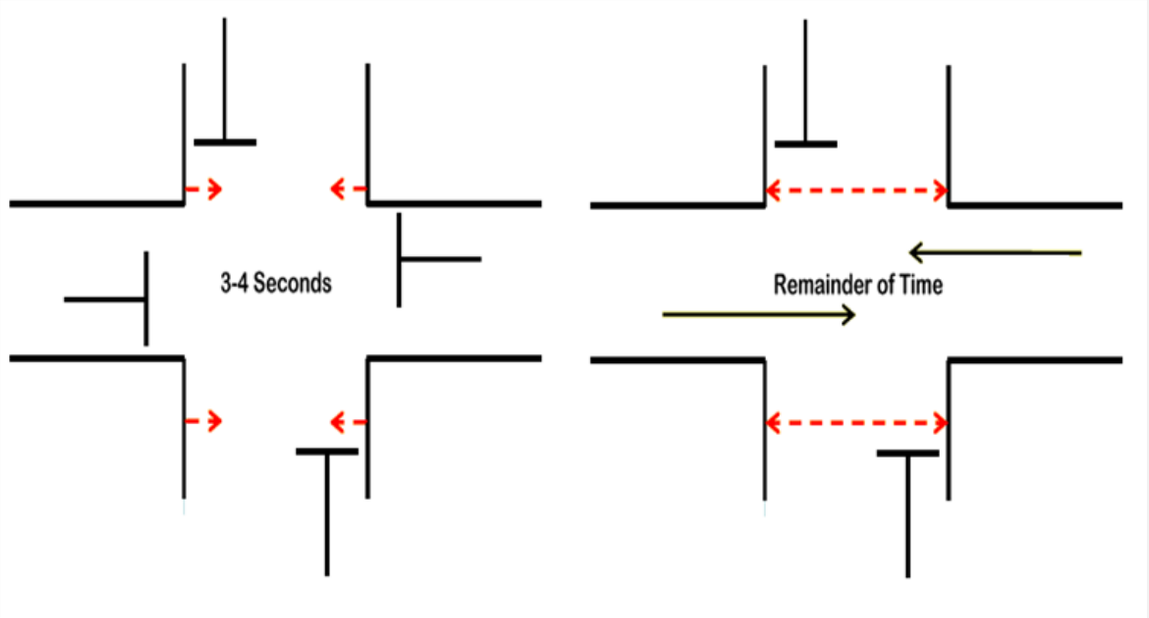
Leading Pedestrian Interval (LPI)

- Leading Pedestrian Intervals (LPI) at all concurrent pedestrian crossings.
- LPI gives pedestrians the opportunity to enter the crosswalk at an intersection 2-7 seconds before vehicle are given a green indication.
- Pedestrians can better establish their presence in the crosswalk before vehicle have priority to turn right or left.



Leading Pedestrian Interval (LPI)

- LPIs increase visibility of crossing pedestrians.
- LPIs reduce conflicts between pedestrians and vehicles.
- LPIs increase likelihood of motorists yielding to pedestrians.
- LPIs enhance safety for pedestrians who may be slower to start into the intersections



Leading Pedestrian Interval (LPI)

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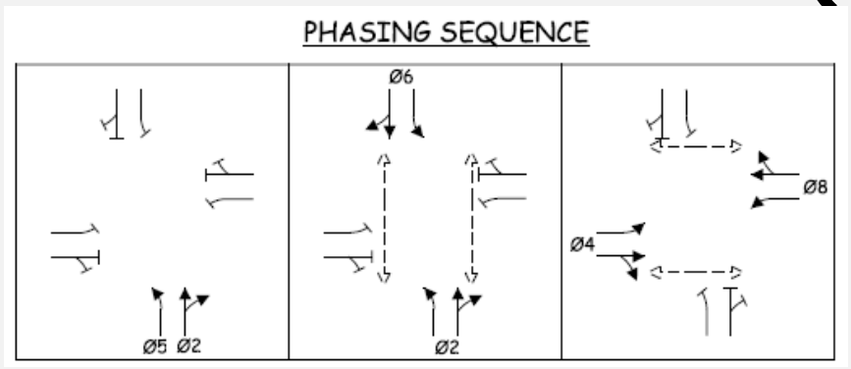

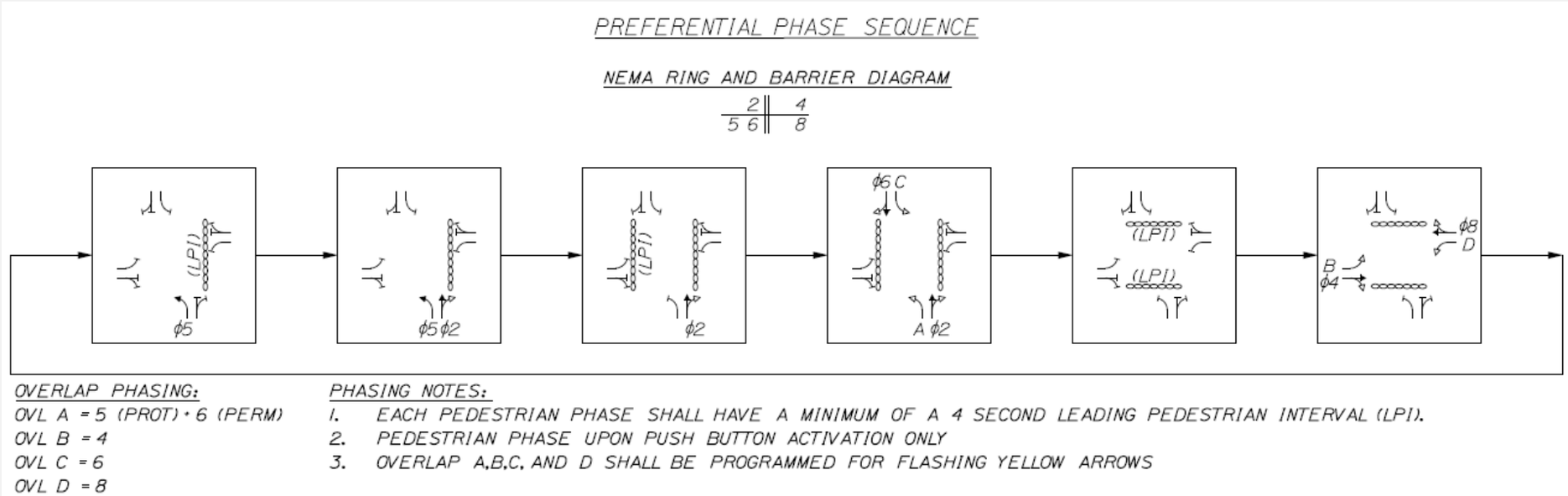

Flashing Yellow Arrows (FYAs)

Source: FHWA-SA-21-039

Flashing Yellow Arrow (FYA)

- Flashing Yellow Arrows will be provided for existing left-turn lanes that have protected-permissive or permissive only signal phasing

Flashing Yellow Arrow (FYA)

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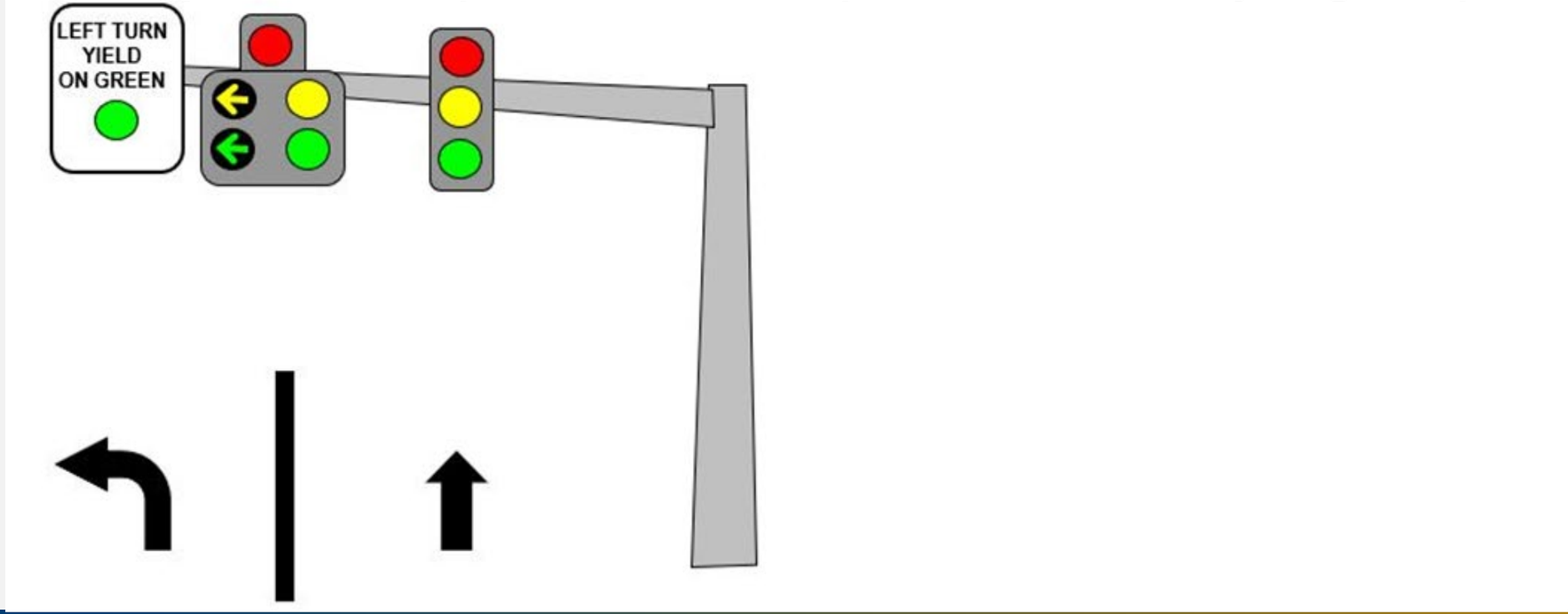

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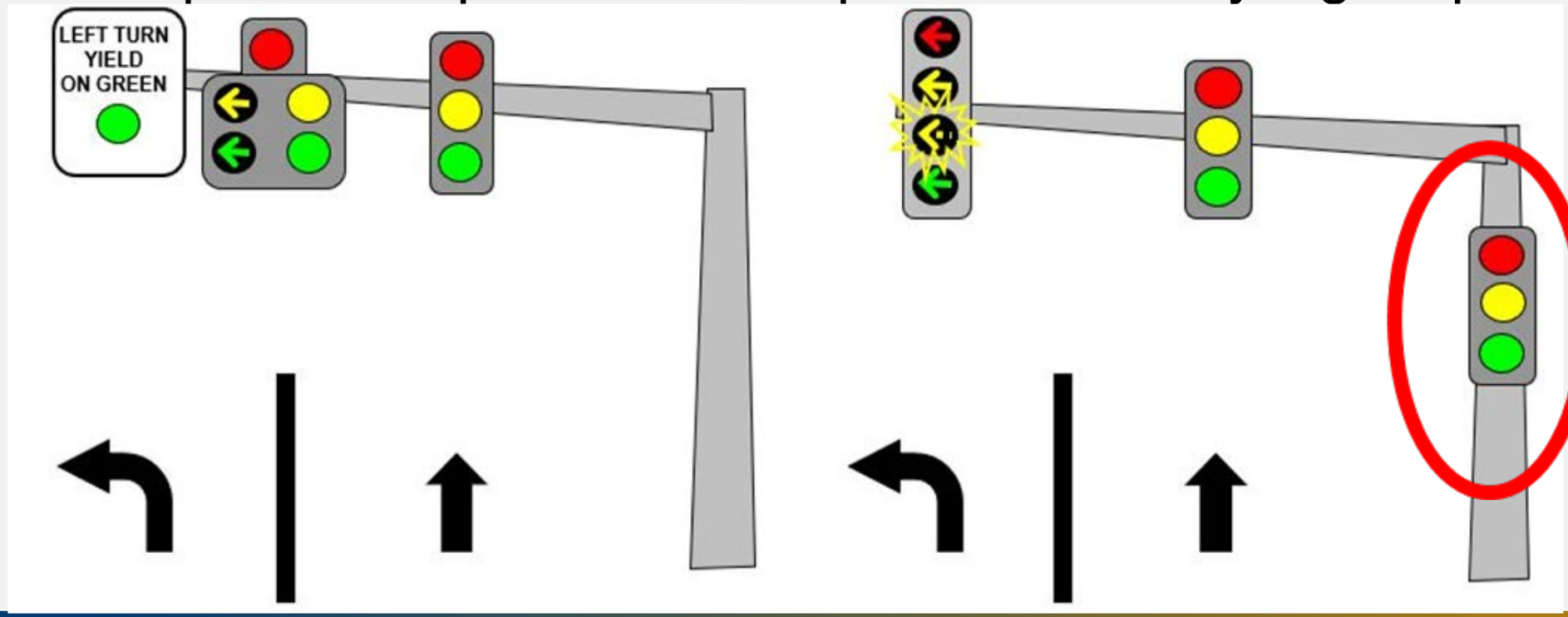


Advanced Detection

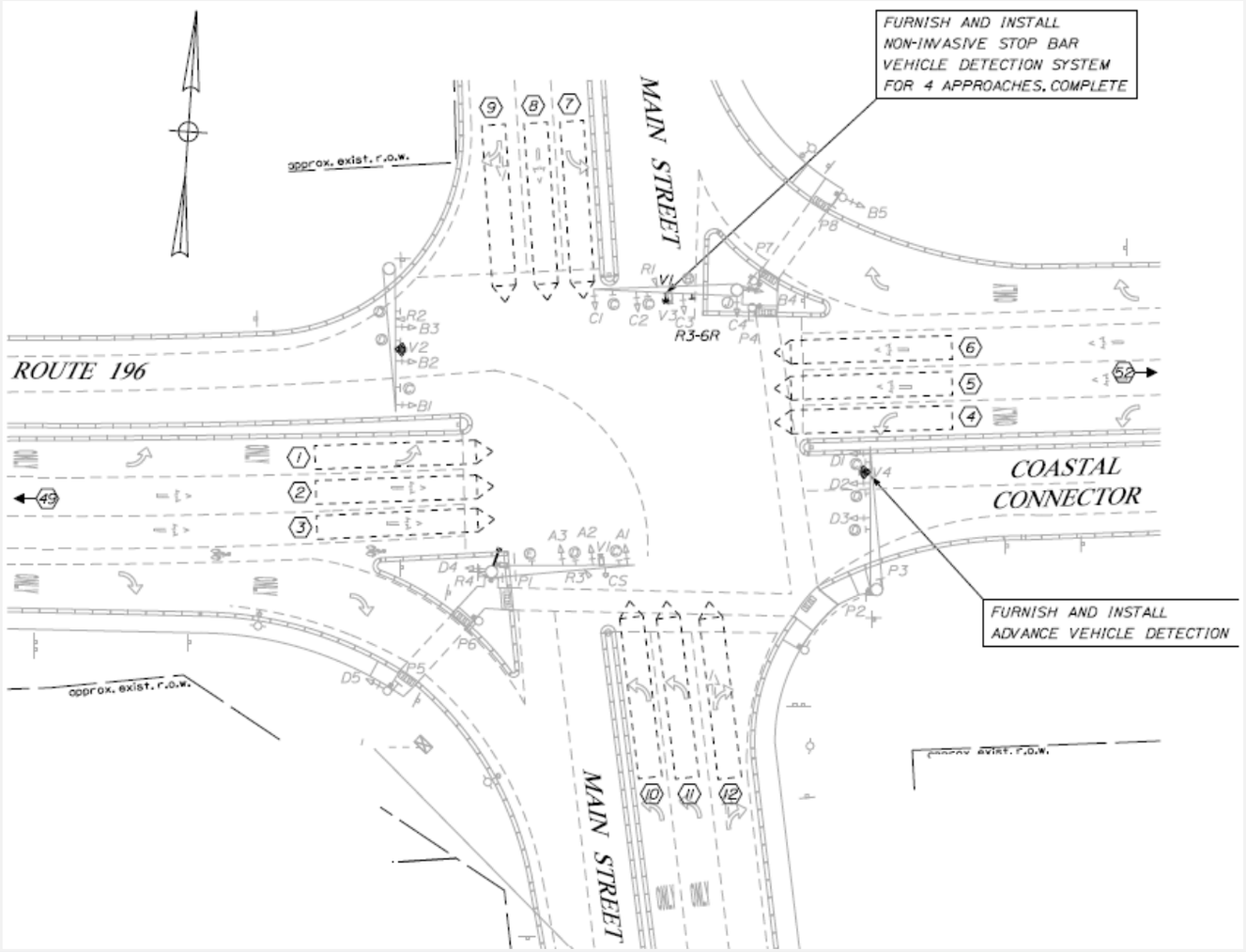
Advanced Detection

- Non-wire loop vehicle detection for STOP line detection.
- Advance (dilemma zone) detection for intersection where speed limit is greater than 35 mph.

Advance Detection

- Advance Detection to be used for 3 different functions:
  - Extend Green
  - Signal Performance Measures (SPM) and Adaptive
  - Dynamic All Red Extension (DARE)
- Detector Assignments
  - Extend Green
    - 49 (EB/SB Mainline)
    - 52 (WB/NB Mainline)
    - 55 (SB/EB Sidestreet)
    - 58 (NB/WB Sidestreet)
  - SPMs and Adaptive
    - 50 (EB/SB Mainline)
    - 53 (WB/NB Mainline)
    - 56 (SB/EB Sidestreet)
    - 59 (NB/WB Sidestreet)
  - DARE
    - 51 (EB/SB Mainline)
    - 54 (WB/NB Mainline)
    - 57 (SB/EB Sidestreet)
    - 60 (NB/WB Sidestreet)

Advanced Detection



DETECTOR SCHEDULE

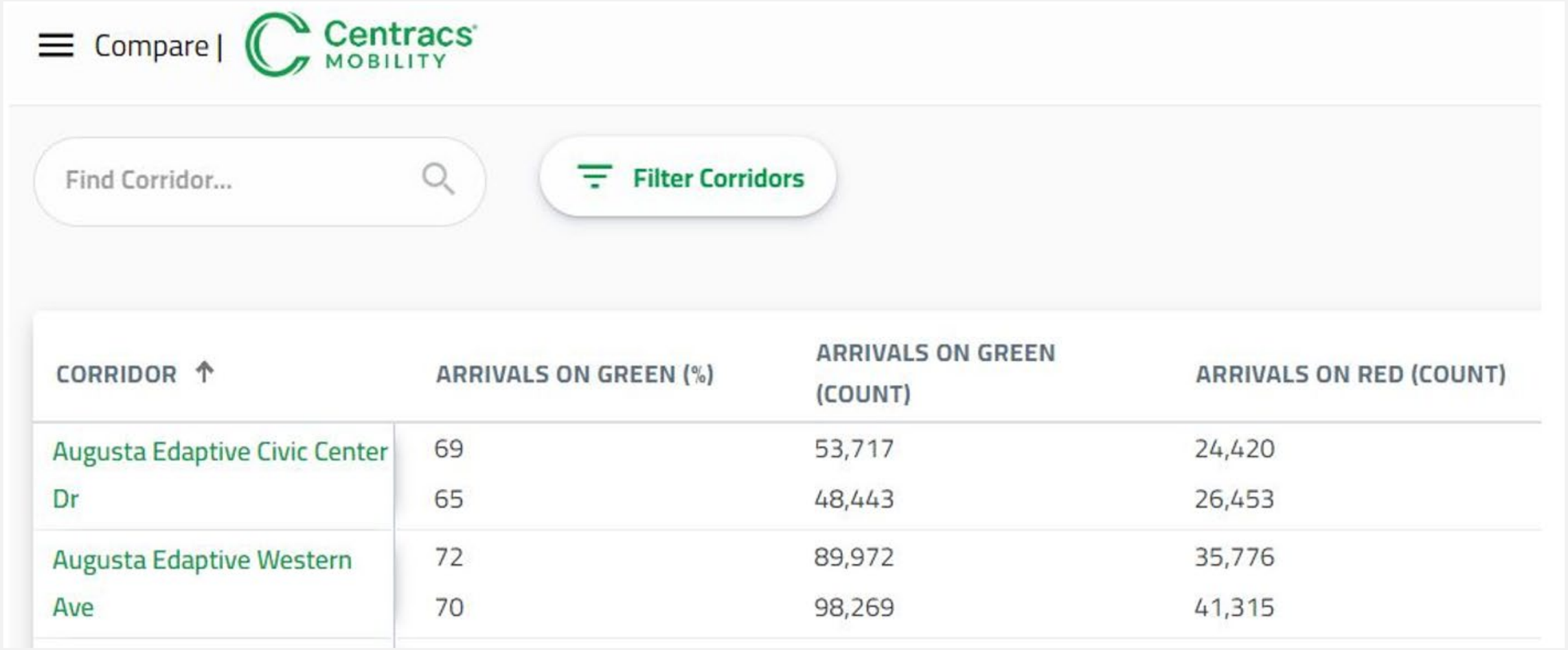
DETECTOR ZONE NO.	LOCATION	ϕ CALLED	ϕ EXT.	MODE A-ADVANCE B-STOPLINE	DELAY TIME	EXT. TIME
1	196 EB LEFT	1	1	B	-	-
2	196 EB THRU INSIDE	6	6	B	-	-
3	196 EB THRU OUTSIDE	6	6	B	-	-
4	196 WB LEFT	5	5	B	-	-
5	196 WB THRU INSIDE	2	2	B	-	-
6	196 WB THRU OUTSIDE	2	2	B	-	-
7	MAIN SB LEFT	3	3	B	-	-
8	MAIN SB THRU	8	8	B	-	-
9	MAIN SB THRU-RIGHT	8	8	B	-	-
10	MAIN NB LEFT INSIDE	7	7	B	-	-
11	MAIN NB LEFT OUTSIDE	7	7	B	-	-
12	MAIN NB THRU-RIGHT	4	4	B	-	-
49	196 EB ADVANCE	6	6	A	-	-
52	196 WB ADVANCE	2	2	A	-	-

Adaptive Traffic Signal Control (ATSC)

Adaptive Traffic Signal Control (ATSC)

- Adapts and adjusts to prevailing travel conditions
- Continuously distributes green time equitably for all movements
- Improves travel time reliability by progressively moving vehicles
- Reduces congestion by creating smoother flow
- Prolongs the effectiveness of traffic signal timing

Adaptive Traffic Signal Control (ATSC)



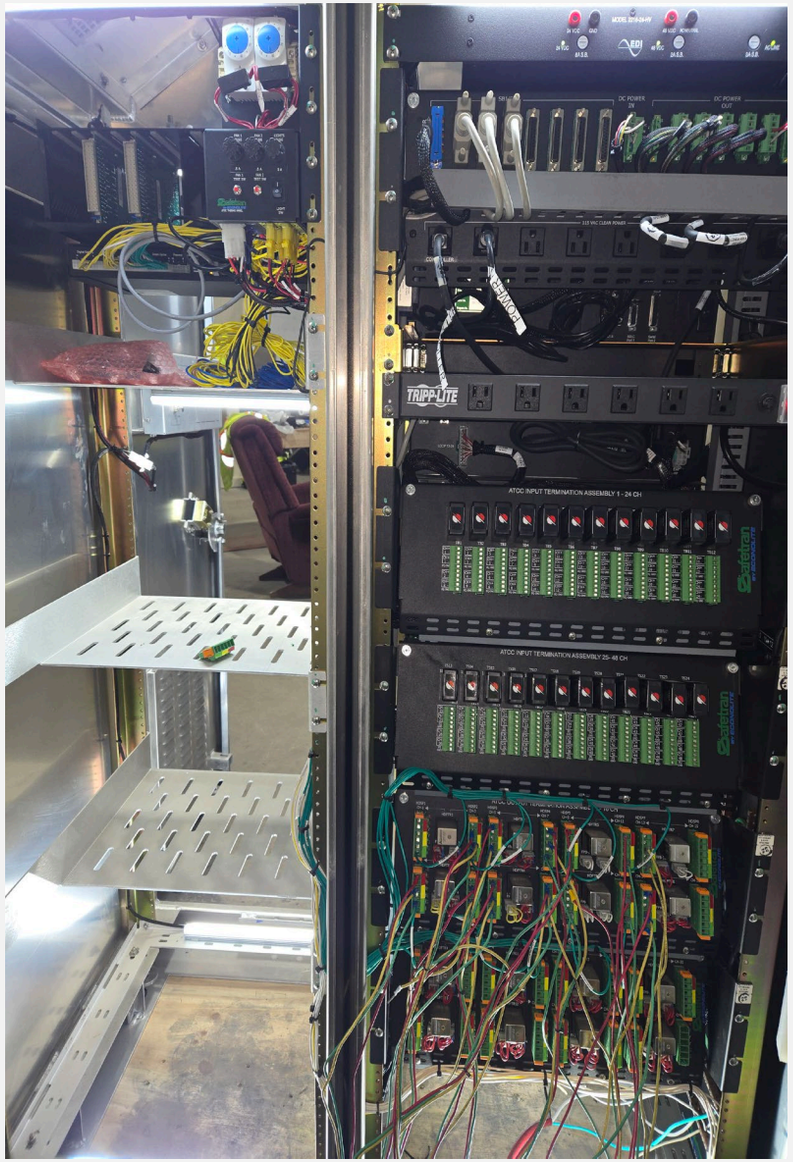
CORRIDOR	ARRIVALS ON GREEN (%)	ARRIVALS ON GREEN (COUNT)	ARRIVALS ON RED (COUNT)
Augusta Edaptive Civic Center	69	53,717	24,420
Dr	65	48,443	26,453
Augusta Edaptive Western	72	89,972	35,776
Ave	70	98,269	41,315

Impacts to Contractors

Technician’s Comfort Level

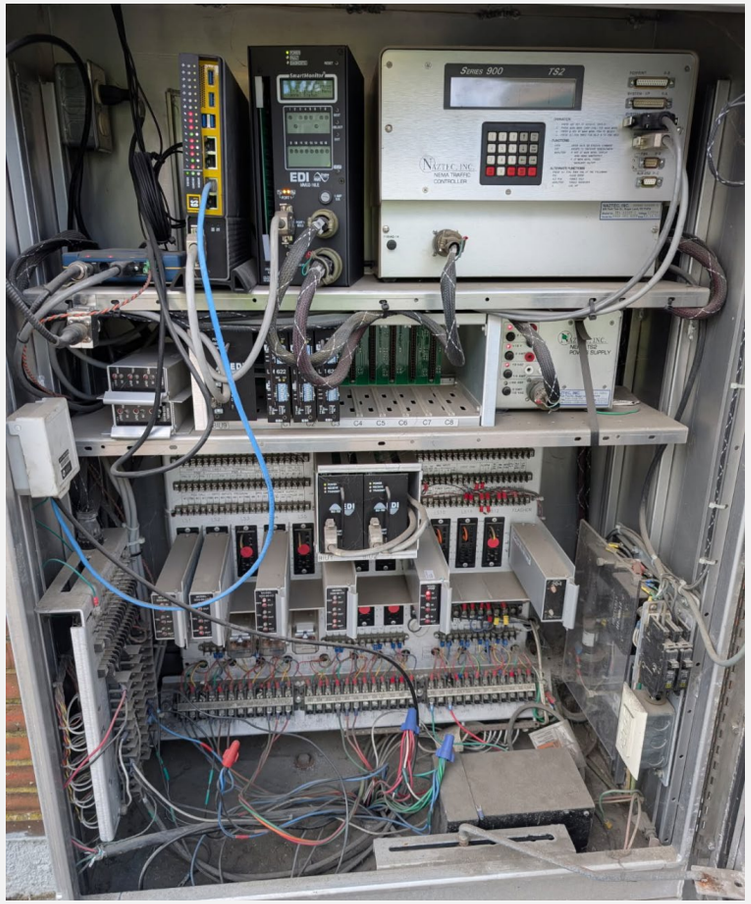
NEMA Cabinets have been the standard for the Northeast since before I was born


ADU 2220
cobalt
Safetran
SA-2


TRIPP-LITE
ATCC INPUT TERMINATION ASSEMBLY 1 - 24 CH
ATCC INPUT TERMINATION ASSEMBLY 25- 48 CH
Safetran

Technician’s Safety

Shock hazards are significantly reduced in the ATC cabinets. Including eliminating unfused power feeds that have the full potential of the high voltage wires feeding a cabinet.

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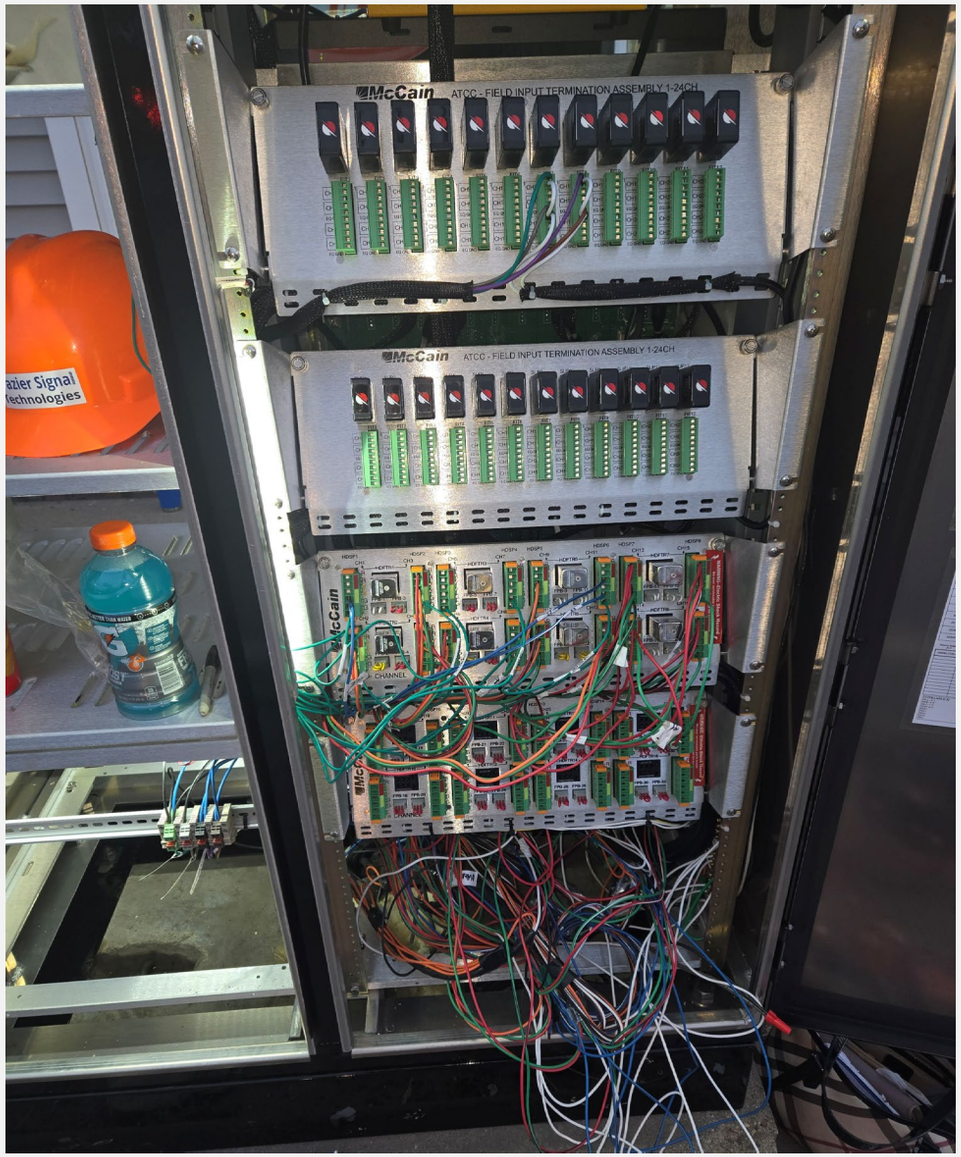

McCain
ATCC - FIELD INPUT TERMINATION ASSEMBLY 1-24CH
McCain
ATCC - FIELD INPUT TERMINATION ASSEMBLY 1-24CH


A
B
12G 12Y 12R 12F PC2 PC4 PC6 PC8
13G 13Y 13R
4G 4Y 4R 4F 5G 5Y 5R 5F
6G 6Y 6R 6F


FIT7
FIT8
FIT9
FIT10
FIT11
FIT12
CH15
CH15
EQ GND

Constructability

One-to-one replacement?

At least the bolt pattern is.


CH: 1 & 2
CH: 3 & 4
CH: 5 & 6
CH: 7 & 8
CH: 9 & 10
CH: 11 & 12
CH: 13 & 14
CH: 15 & 16
OUTPUT SIU #1
2212-HV
Safetran
CH: 17 & 18
CH: 19 & 20
CH: 21 & 22
CH: 23 & 24
CH: 25 & 26
CH: 27 & 28
CH: 29 & 30
CH: 31 & 32
OUTPUT SIU #2
2202-HV


TURNING
VEHICLES
YIELD
TO


EXIT
PUSH BUTTON
FOR


NO
TURN
ON RED
TURNING
VEHICLES
YIELD
TO

Initial Cost

A new NEMA cabinet with similar functionalities, unconfigured and uninstalled, costs approximately $25,000.

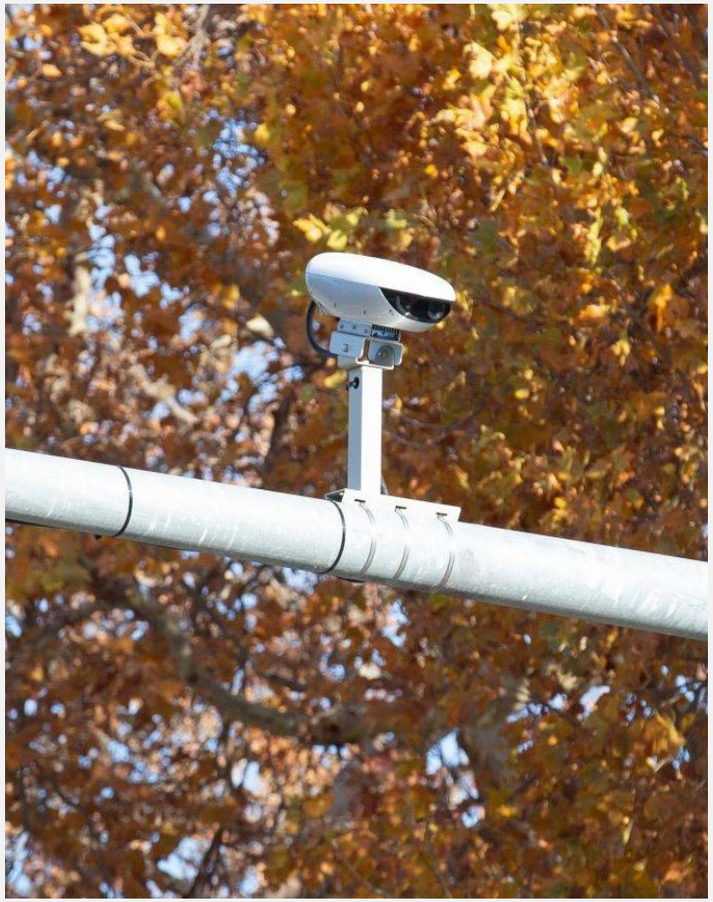
A new ATC cabinet, unconfigured and uninstalled, costs approximately $55,000.

Maintenance Cost

A single point camera replacement costs approximately $5,000.

Replacement Cost

A directional camera replacement costs between $1,000 to $2,500.



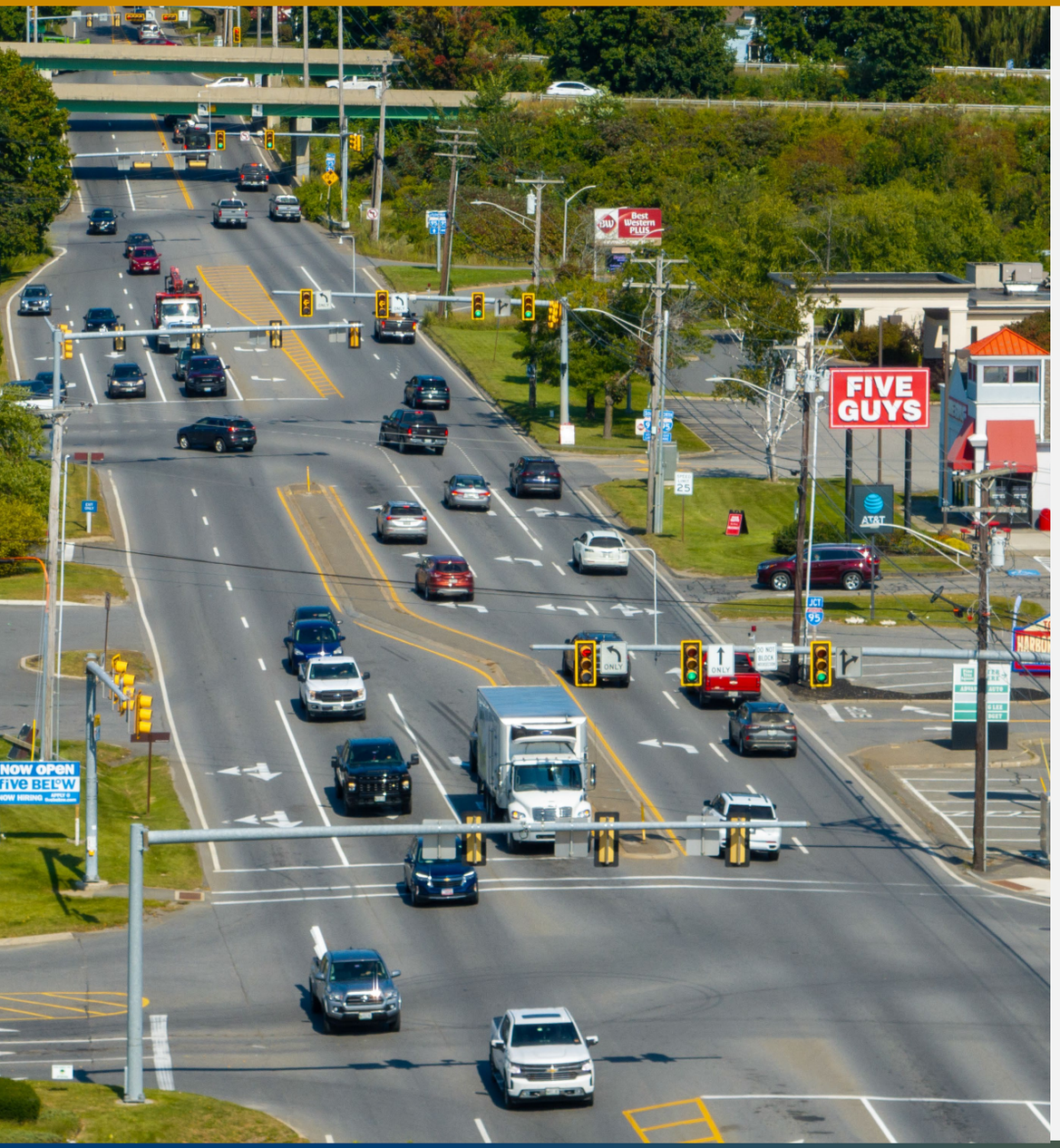
Bench Testing

MaineDOT Policies and Standards

Traffic Analysis Guidelines
Traffic Signal Design and Operations

- Guidance on MUTCD Signal Warrants
- ADA Requirements
- Traffic Signal Plans
- Traffic Signal Operations
- Traffic Signal Equipment

MaineDOT



Traffic Modeling Guidebook

- Procedure Based Guide
- Data Requirements
- Synchro Model Development
- Sim Traffic Setup
- Reporting

MaineDOT Standard Specifications

- SP 643 – Traffic Signals
- SP 718 – Traffic Signal Material

The Road Ahead

- Asset Management and Maintenance
- Proactive Signal Operations
- Integrated Corridor Management
- Traffic Monitoring
- Connected Vehicle

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