Montrose Rd – Smart Signal Corridor

ASCT SE and Pilot Study

Dec 7, 2018

PennState College of Engineering | TRANSPORTATION ENGINEERING AND SAFETY CONFERENCE

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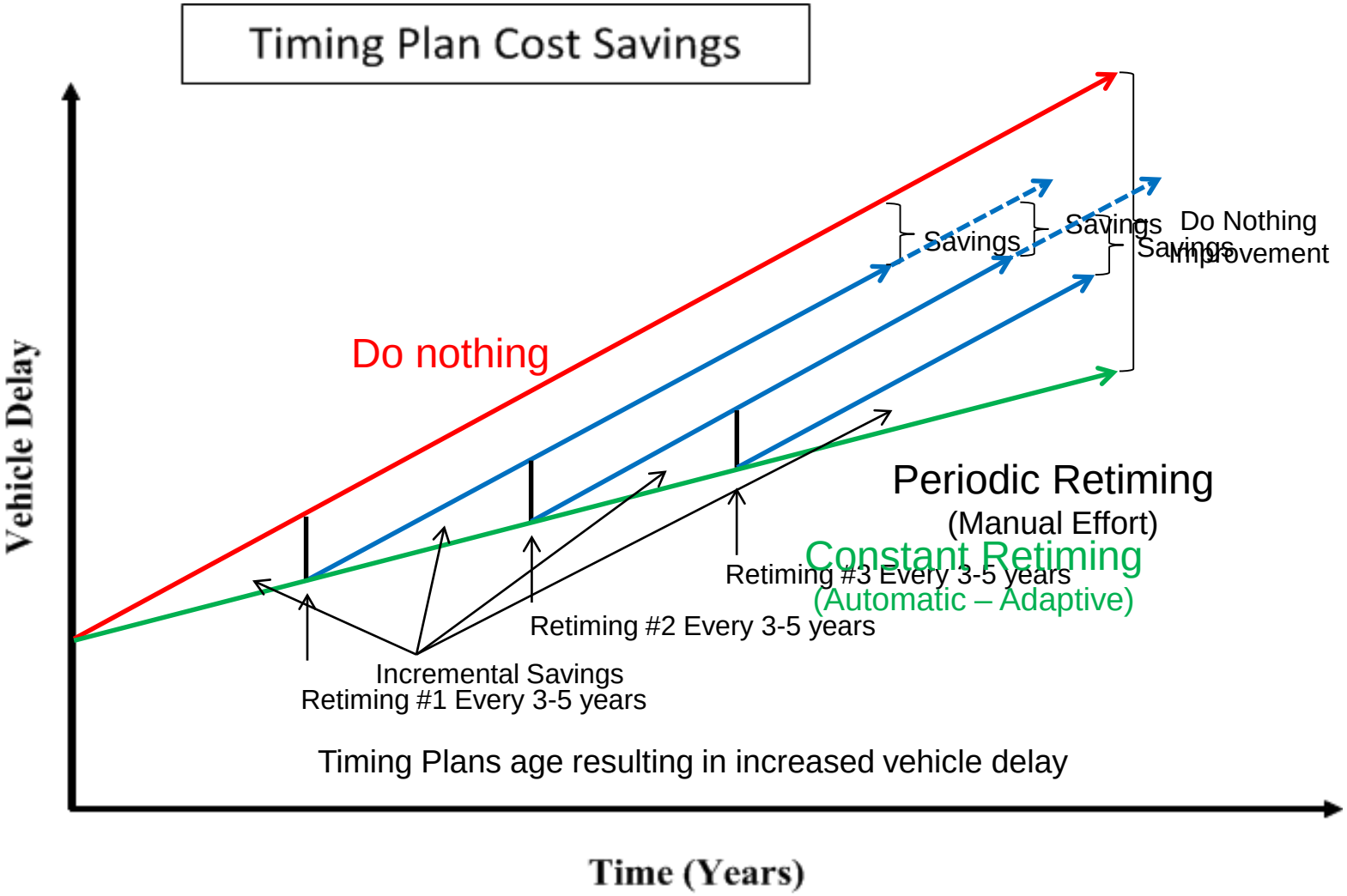
Discussion Outline

1. Adaptive Signal Control Technology
2. Preliminary Engineering & Design Process
3. Montrose Rd. Pilot Deployment
4. Lesson Learned

Traffic Adaptive Benefits



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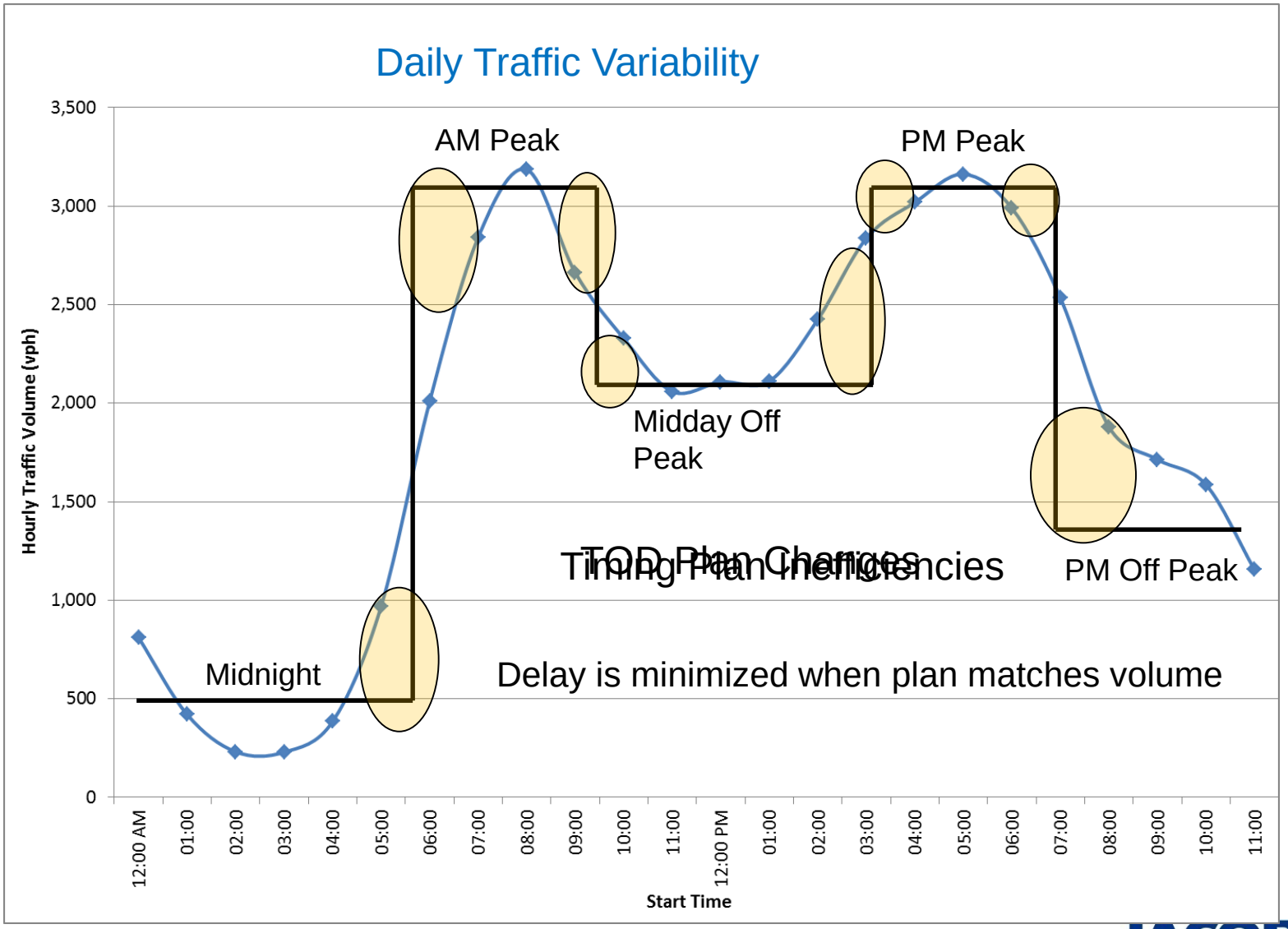
Traffic Adaptive Benefits



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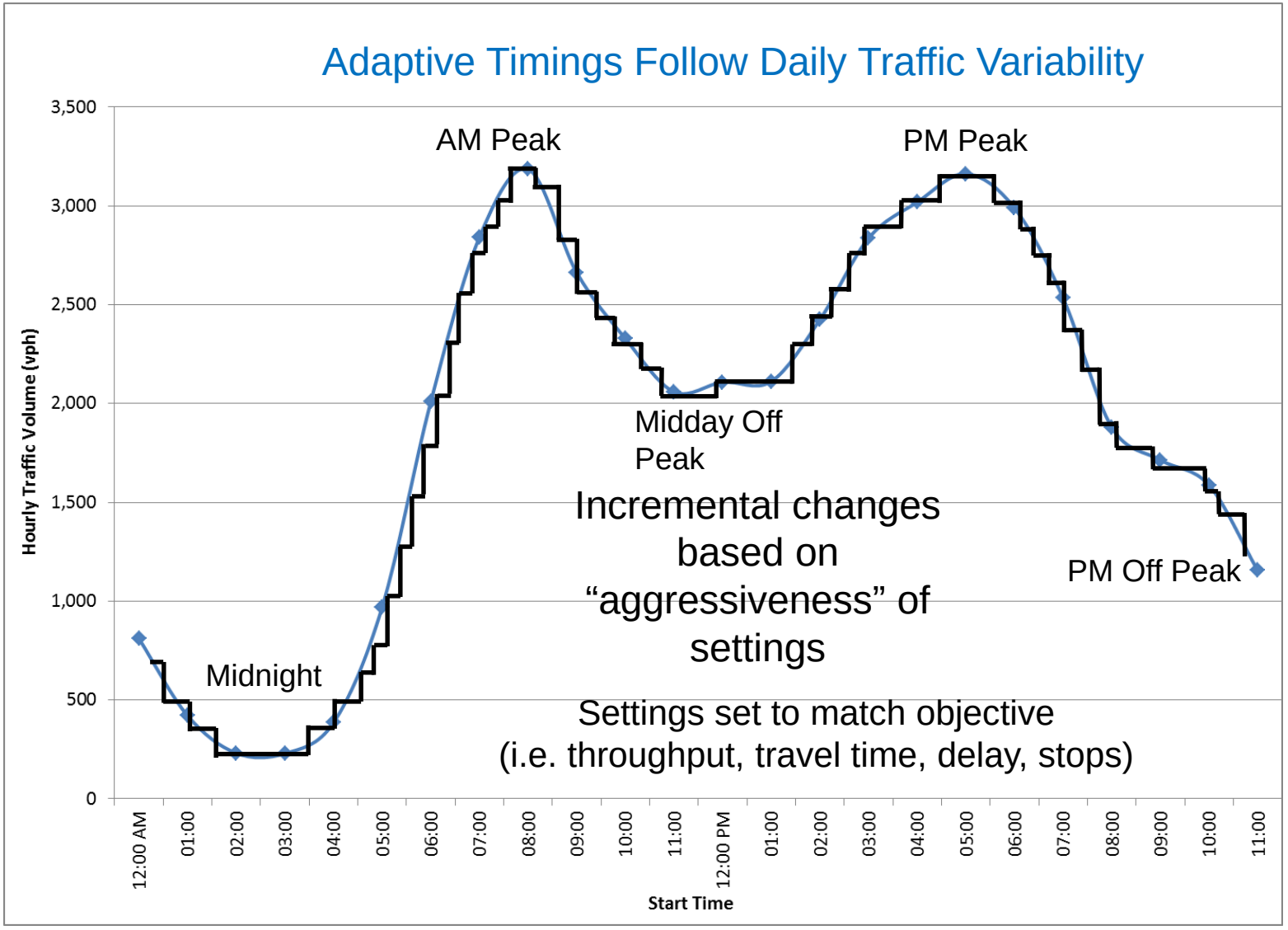
Traffic Adaptive Benefits



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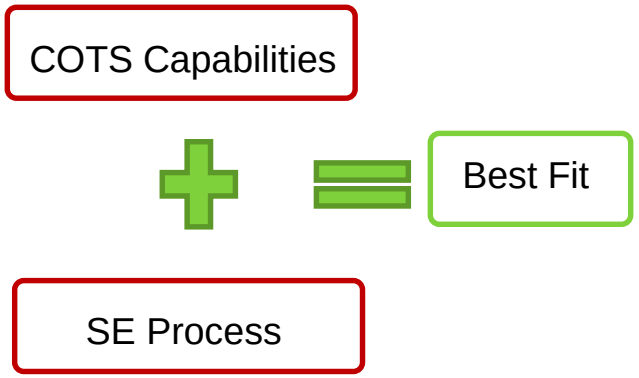
Challenges – know the Objectives

- Traffic Issues – what are we trying to address?
  - Onset of peak period variability
  - Inefficient plans to accommodate demand variability
  - Incident detection/response
  - Multi-modal mobility
- Performance Based Management – Data Driven
  - Measurable, rational and defendable
- Operations and Maintenance
  - Higher reliance on automation > systems

Planning and Preliminary Engineering

- Modified Systems Engineering Process
  - "Best Fit" COTS solution



- 3 Phase Approach
  - Initial Criteria Screening to identify candidate systems (top down)
  - Detailed Needs and Requirements Analysis to identify selected system(s) (bottoms up)
  - Bench/Pilot Test – side-by-side verification (kick the tires)

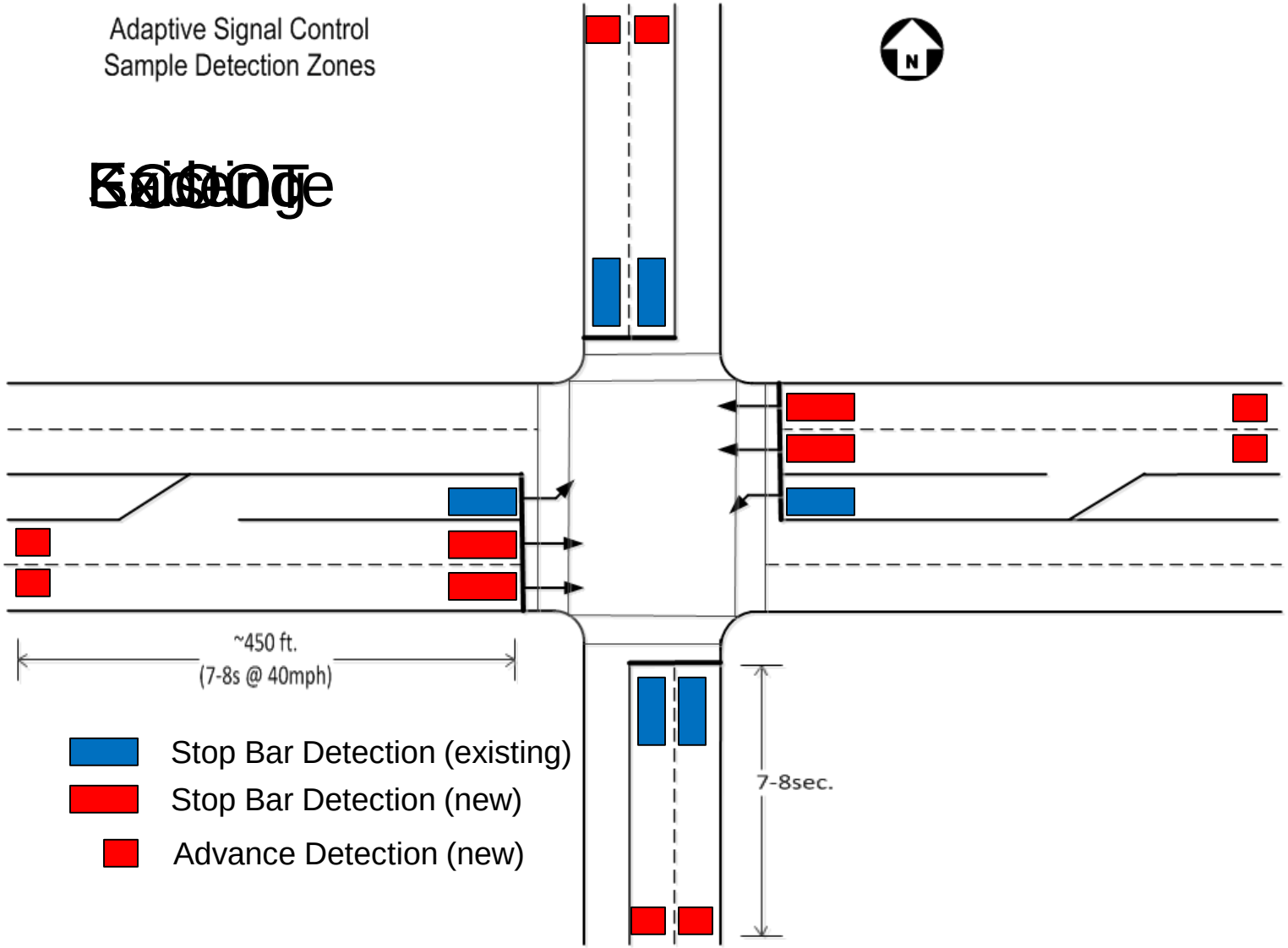
Traffic Adaptive Systems Evaluated

Comparison	Kadence	SCOOT
Cost	$$	$$$
Optimization	Split, Cycle, Offset in steps	Split, Cycle, Offset continuous
Detection	Existing stop bar and arterial advance detectors	Upstream per-lane detectors all approaches
Responsiveness	Slow – every few cycles	Very Fast – Each cycle or phase
Application	Mainly arterials	Grids, arterials, all combinations
Architecture	NTCIP – uses inherent controller capability	Gemini Outstation cabinet hardware
Notable Features	TOD Tuner, Saturation Enhancements	Bus priority, gating, incident detection

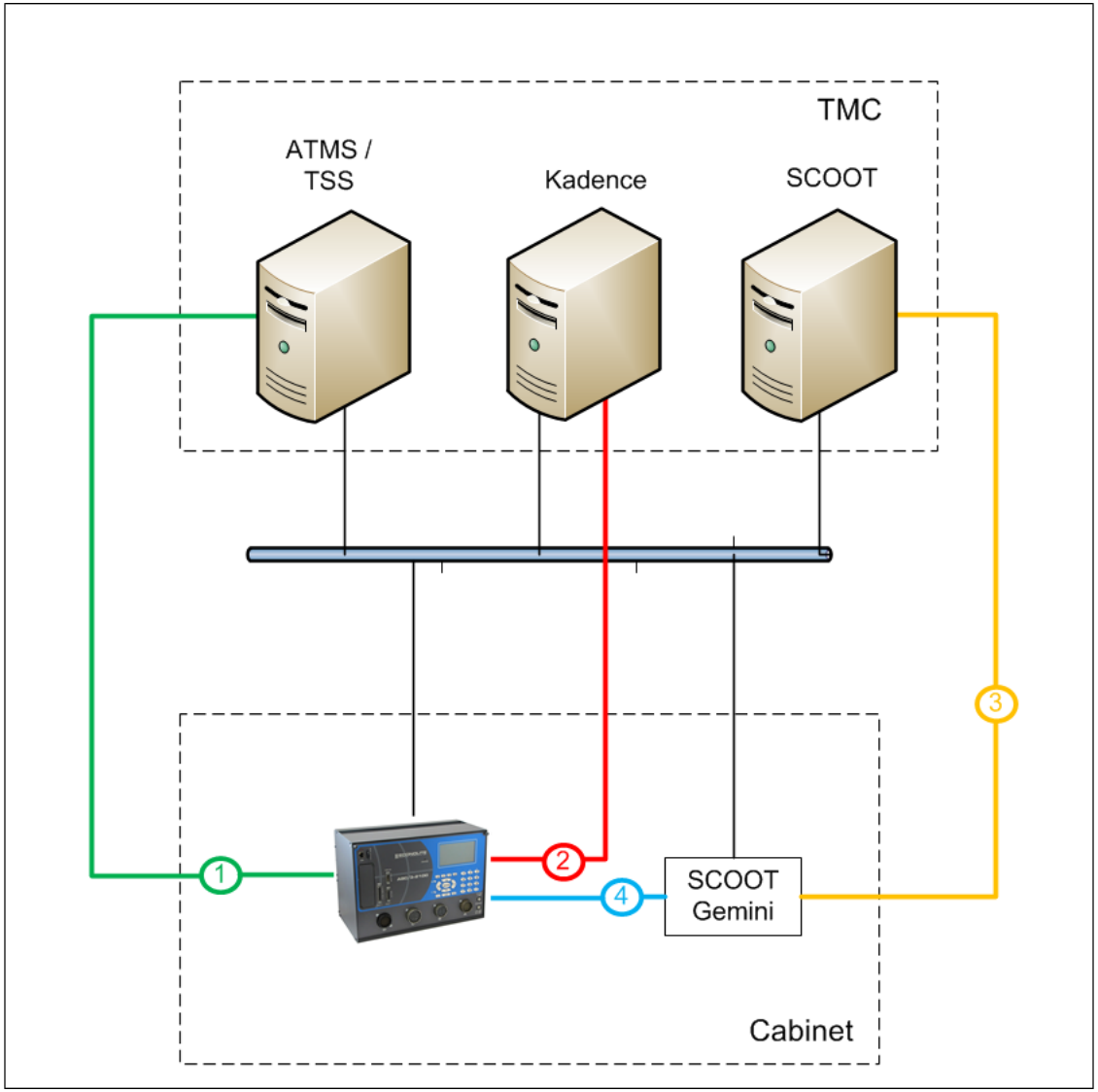
Pilot Implementation

- Field Survey – existing conditions and improvements
  - Detection – evaluated different technologies
  - CCTV coverage
  - Cabinet upgrades
- Understanding Existing Conditions – Before analysis
- Verification Plan – how well did it meet requirements
- Validation Plan – independent MoE data collection

Traffic Adaptive Detection



Montrose Rd ASCT Architecture



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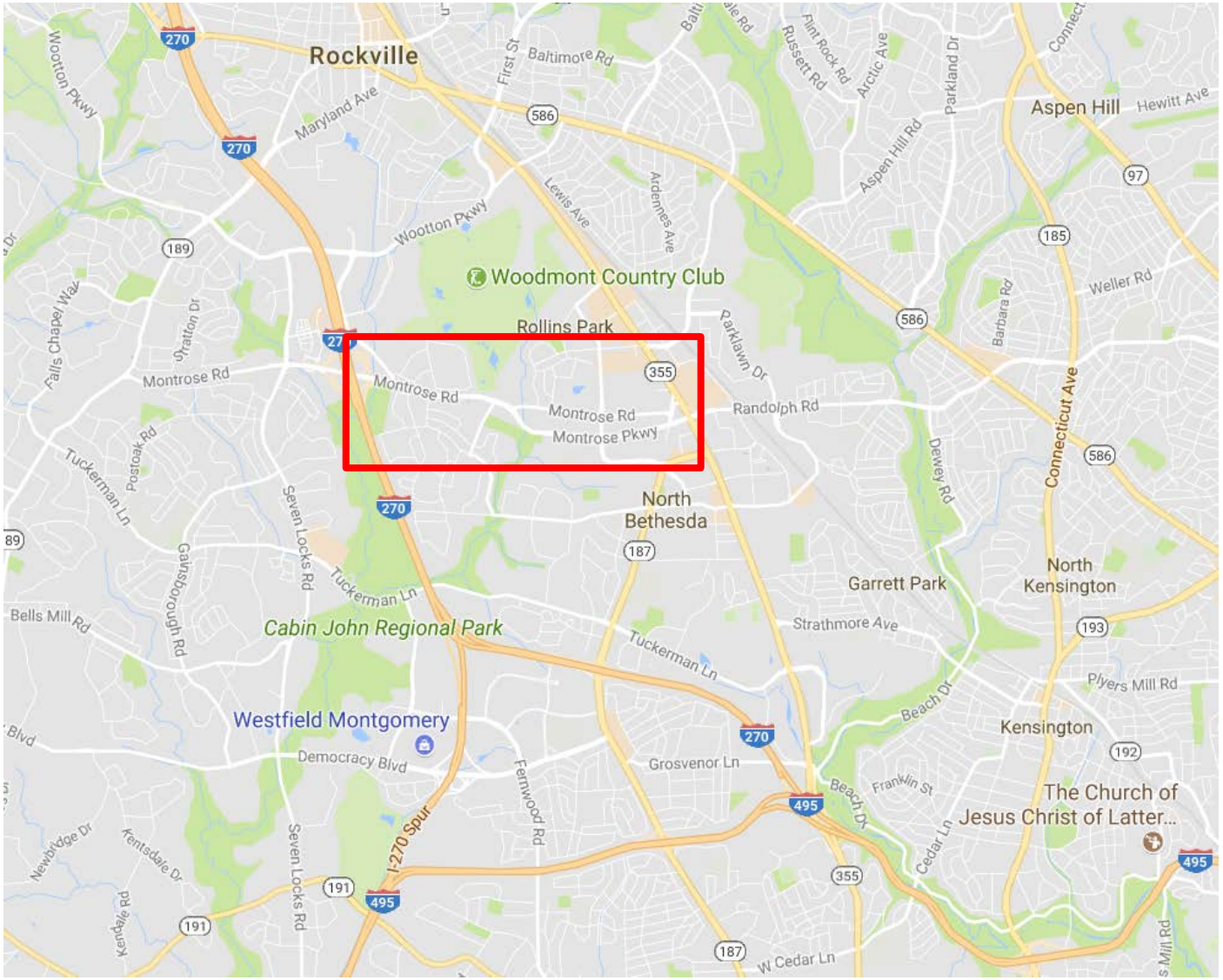
Montrose Rd Pilot Corridor



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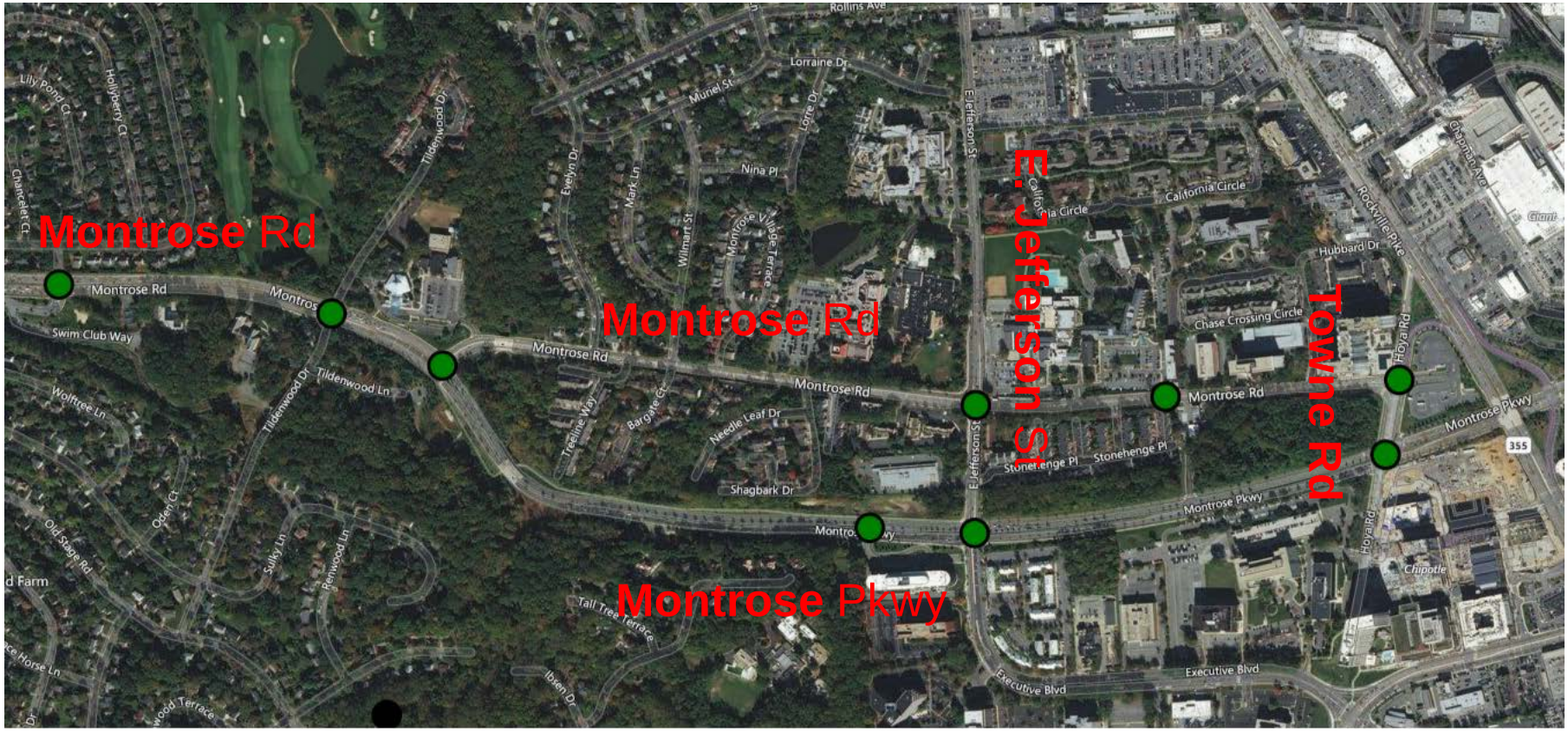
Montrose Rd Pilot Corridor



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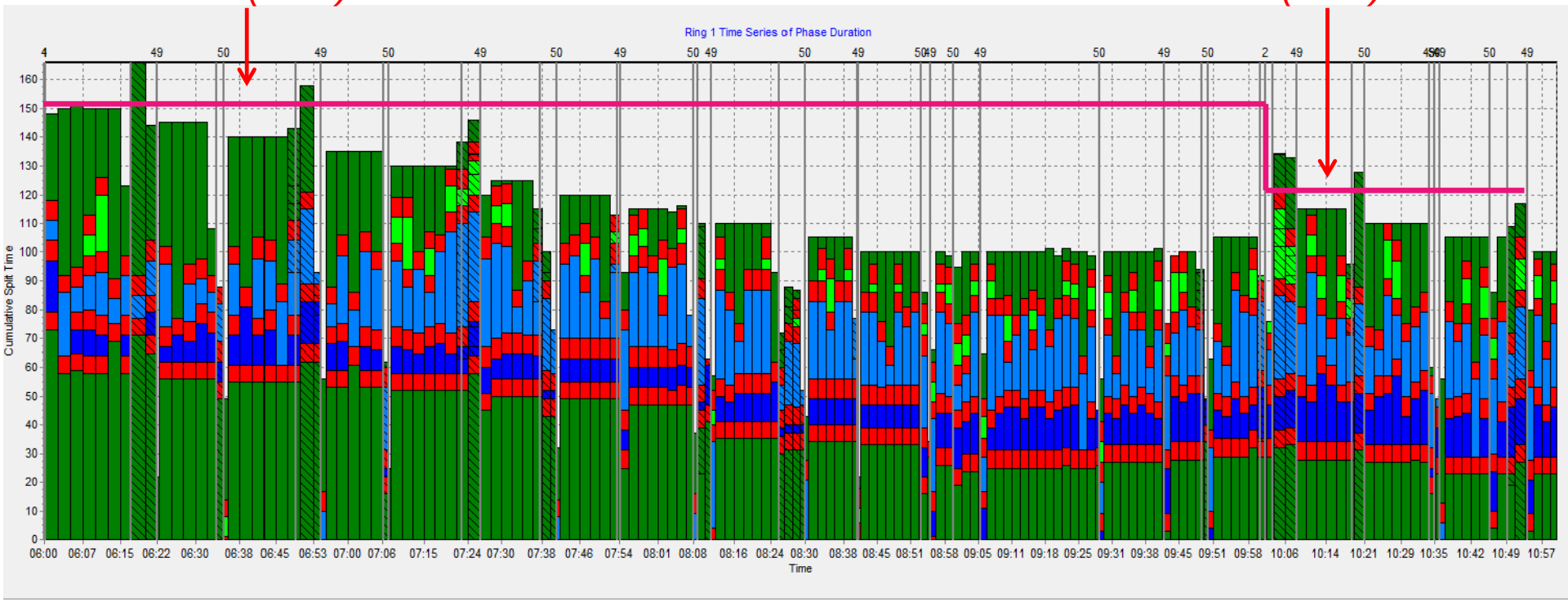
Kadence

Cycle and Split Tuning

PLN 1: 150s (0600)

PLN 2: 120s (1000)



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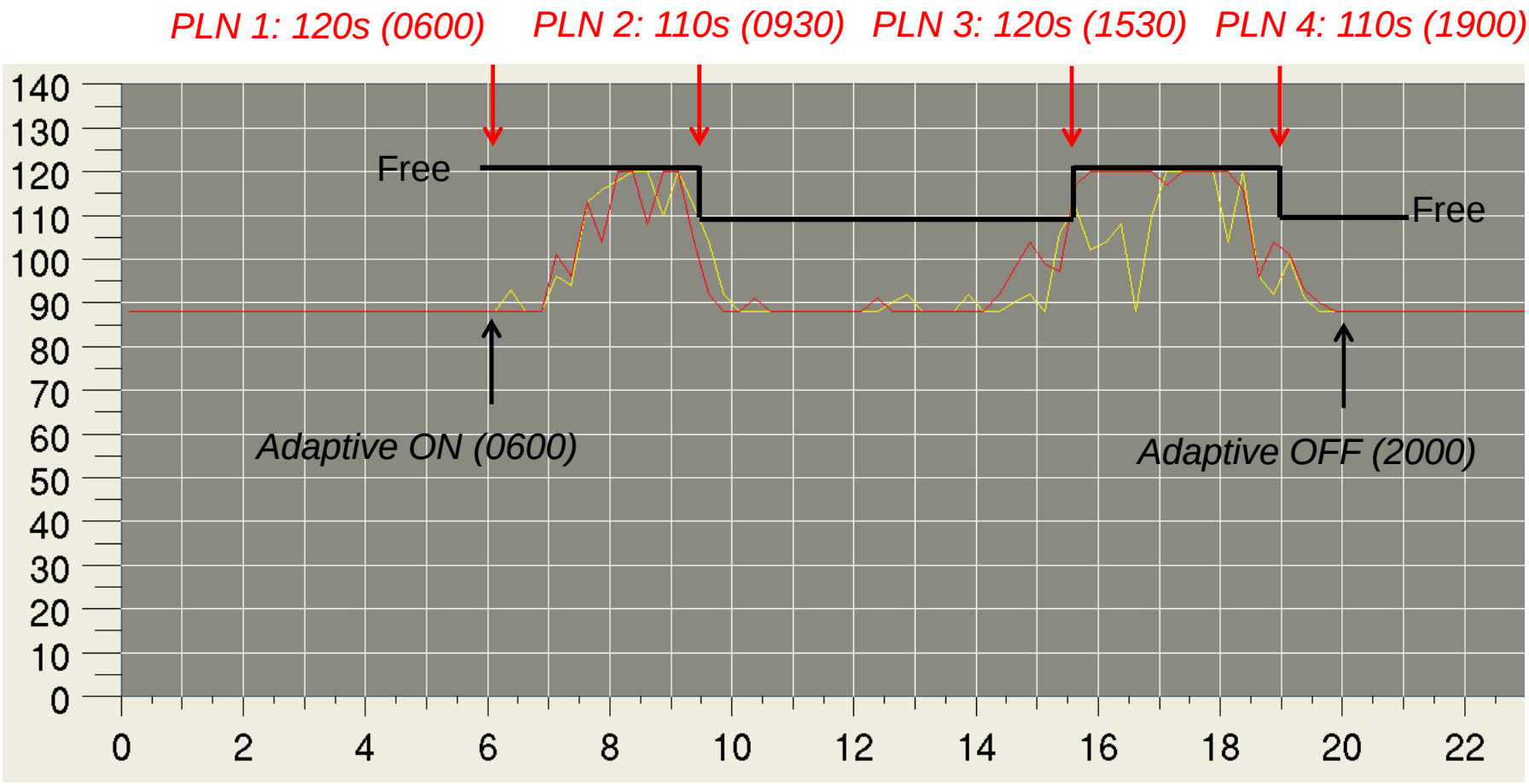
Cycle Tuning



Wednesday Oct 18 ***Wednesday Oct 11***

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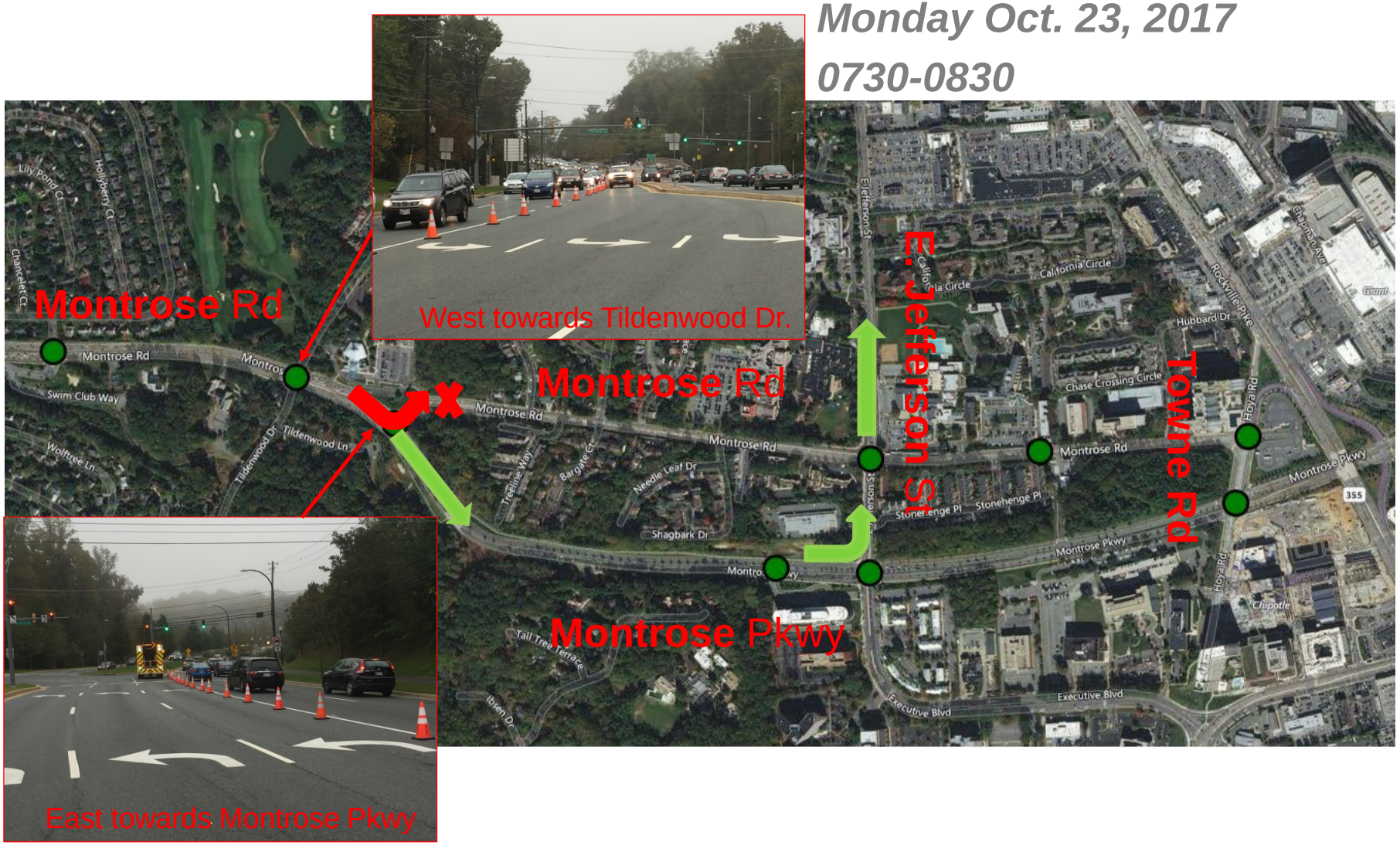
Montrose Rd & Montrose Pkwy Incident

Monday Oct. 23, 2017

0730-0830



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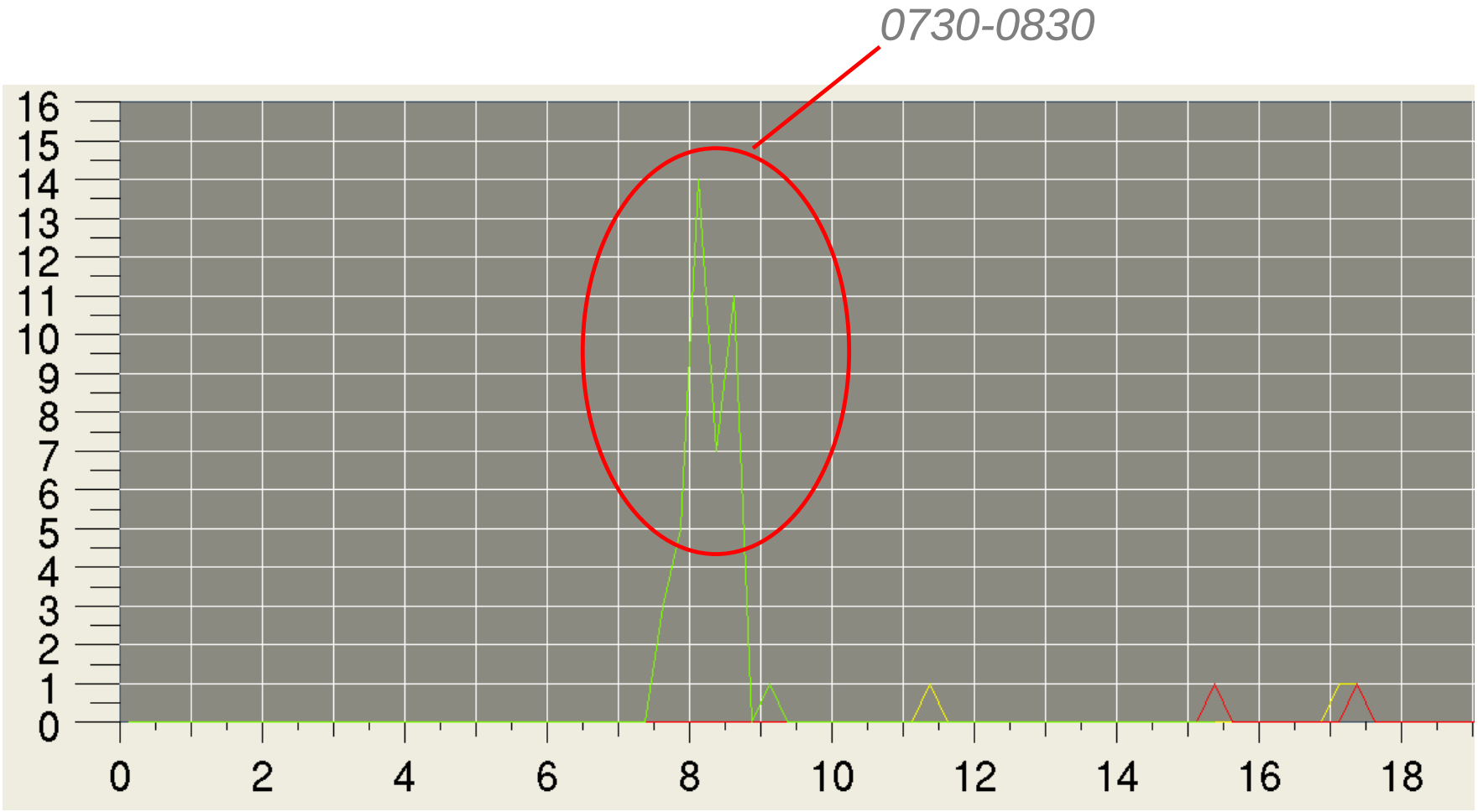
Montrose Rd & Montrose Pkwy Incident

Int. #809 – Kaiser Driveway EB Congestion



Monday Oct 23 *(incident)*

Monday Oct 16

Monday Oct 9

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Montrose Rd & Montrose Pkwy Incident

Int. #785 – E. Jefferson & Montrose Pkwy EBLT Green Time

Monday Oct 23 *(incident)*

Monday Oct 16

Monday Oct 9

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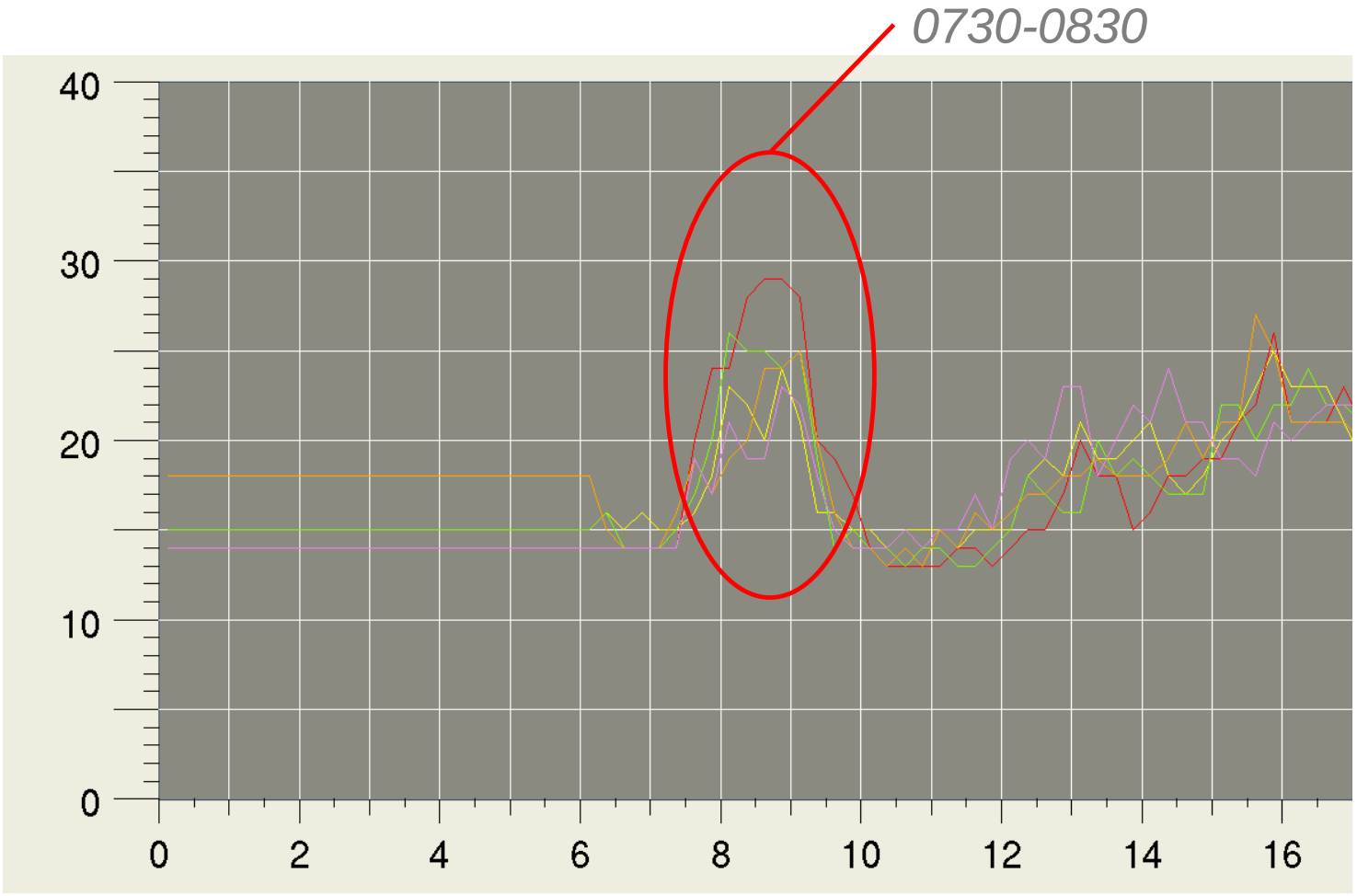
Montrose Rd & Montrose Pkwy Incident

Int. #23 – E. Jefferson & Montrose Rd. NB Stage (split) Time



Monday Oct 23
(incident)

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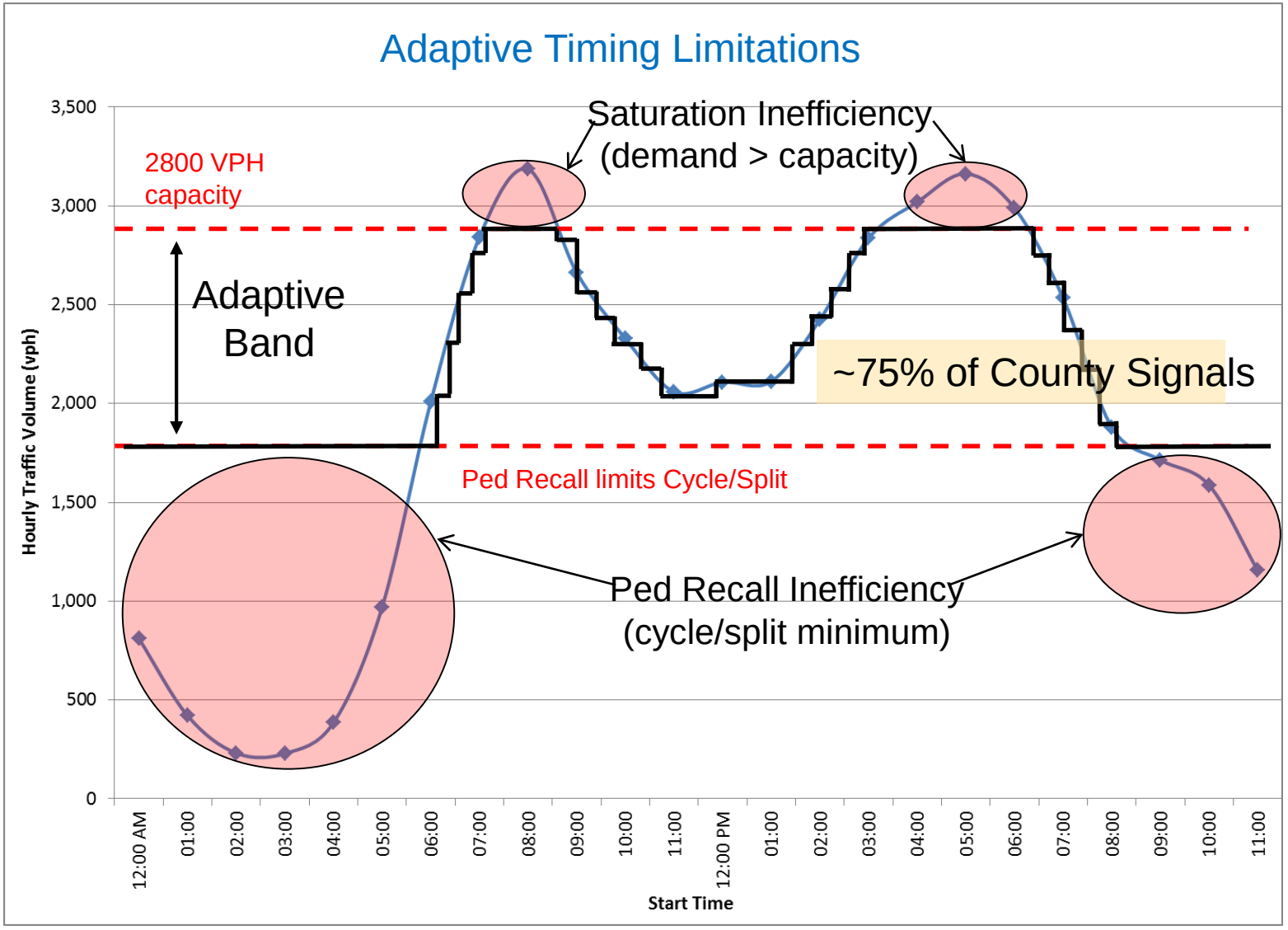
Lessons Learned



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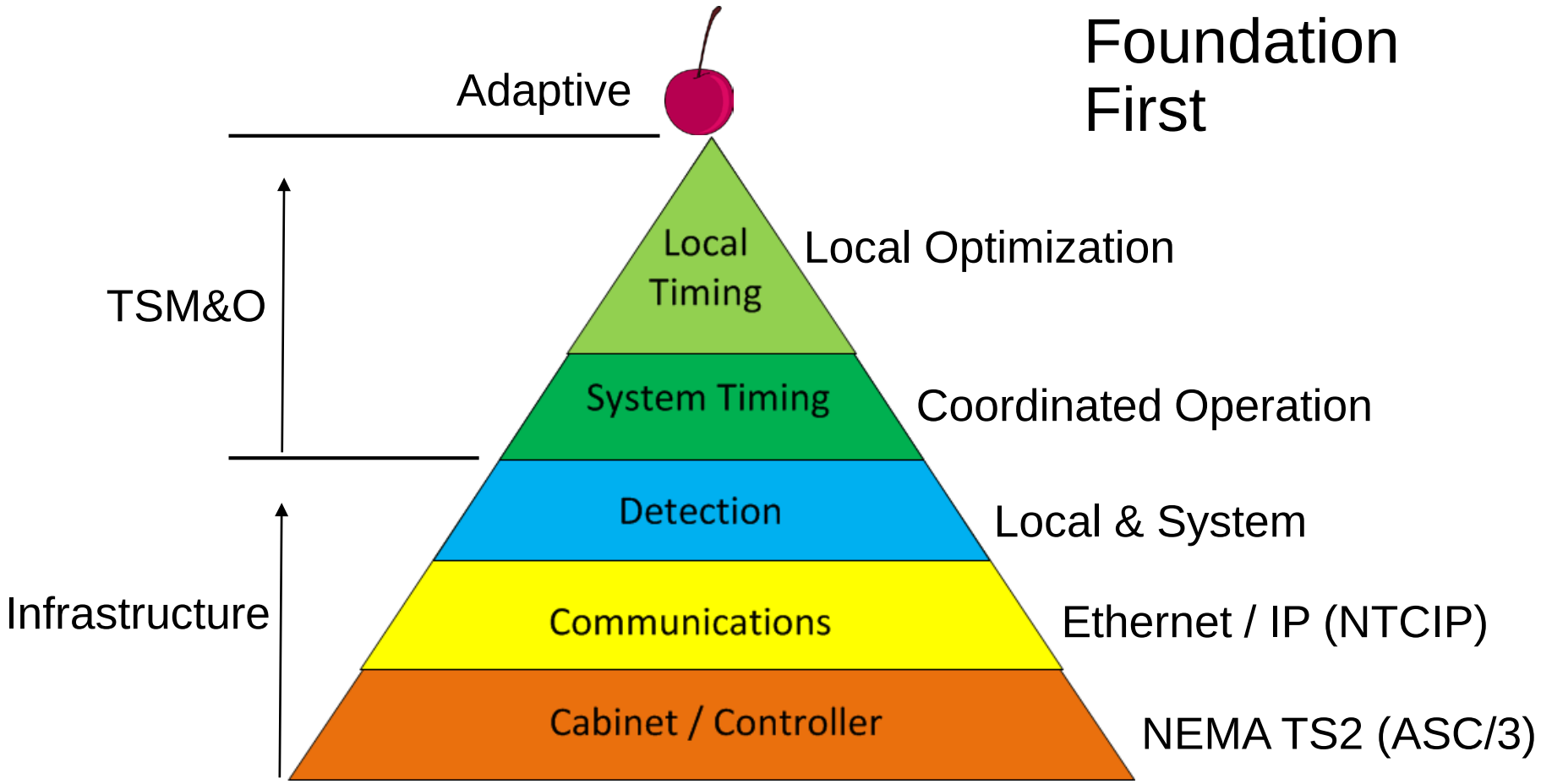
Lessons Learned

Build the Foundation First



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Lessons Learned

- Systems Engineering – develop a common understanding
- Senior Management Support – County Executive and Council
- Engage all stakeholders – own the process, develop champions
- Staffing impacts from a change in operations
- Uncovered problems with existing infrastructure – detection
- Higher maintenance costs
- Adaptive = central, controller/firmware, detection, communications
- Prioritize deployment – may not be useful everywhere
- Technology is not static
- Manage Expectations!!

Thank You

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