



CONFIGURATION UTILITY

UDOT Automated Traffic Signal Performance Measures

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ATSPM Configuration

Signal

Signal ID

Street Names

IP Address

Lat/long

Region

Controller Type

Chart Notes

Approach

Direction

Protected Phase

Permissive Phase

Description

Detector

Detector Channel

Detection Type

Lane & Movement Type

Date Added

Internal Comment

Detection-specific Parameters

ATSPM Configuration - Signal

Signal 7220

[Save](#) 
[Copy](#) 

Primary Name	Secondary Name	IP Address	Latitude	Longitude	Region
Foothill Drive	1300 South	10.10.10.10	40.74168829	-111.8272567	Region 2 ▾

Controller Type ASC3 **Display On Map**

If unchecked, signal will still show in Signal List. If unchecked and IP is configured, the system will still retrieve data.

Chart Notes 

Expand to create notes that will appear when displaying a metric for this signal

Chart Notes 

Comment

Text

Purdue Phase Termination
 Split Monitor
 Pedestrian Delay
 Preemption Details
 Turning Movement Counts
 Purdue Coordination Diagram
 Approach Volume
 Approach Delay
 Arrivals On Red
 Approach Speed
 Yellow and Red Actuations
 Purdue Split Failure

Create

ATSPM Configuration – Approach

Phase/Direction

SBL Ph1 (3 Detector(s))					Copy	Delete	X
Direction	Description	Protected Phase	Permissive Phase	Overlap			
SB	SBL Ph1	1		<input type="checkbox"/>	Indicates the number in Protected Phase is the overlap number.		

Approach direction

Informational text for Phase/Direction header

Detector's primary phase. Usually the phase for through movement and the protected phase for P&P left turns.

Secondary phase for detector. Usually 0 for through movements and protected-only left turns. Input the permissive phase for P&P left turns.

Phase/Direction

SBL Ph1(6) (2 Detector(s))					Copy	Delete	X
Direction	Description	Protected Phase	Permissive Phase	Overlap			
SB	SBL Ph1(6)	1	6	<input type="checkbox"/>			

ATSPM Configuration – Detection

EBT Ph4 (7 Detector(s)) Copy Delete X

Direction	Description	Protected Phase	Permissive Phase	Overlap
EB	EBT Ph4	4		

Detectors +

Detector 722038	Copy Delete X
Detector 722039	Copy Delete X
Detector 722040	Copy Delete X
Detector 722041	Copy Delete X
Detector 722042	Copy Delete X
Detector 722051	Copy Delete X
Detector 722052	Copy Delete X

ATSPM Configuration – Detection

Detector 722020 Copy  Delete 

Det Channel	Lane Number (Lane-by-lane Count)	Date Added	
20	1	3/27/2015 12:00:00 AM	Currently unused

Detection Types

- Advanced Count
- Advanced Speed
- Lane-by-lane Count
- Lane-by-lane with Speed Restriction
- Stopbar Presence

Movement Type (Lane-by-lane Count) **Detector Comment** 

Thru-Right

Lane Type (Lane-by-lane Count)

Vehicle

Lane Type (Lane-by-lane Count)

Vehicle

- Vehicle
- Bike
- Pedestrian
- Exit
- Light Rail Transit
- Bus
- High Occupancy Vehicle

Movement Type (Lane-by-lane Count)

Thru

- Thru
- Right
- Left
- Thru-Right
- Thru-Left

Internal only

ATSPM Configuration – Configuration Table

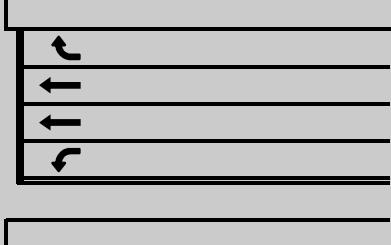
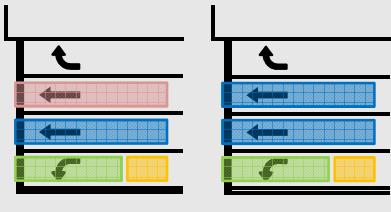
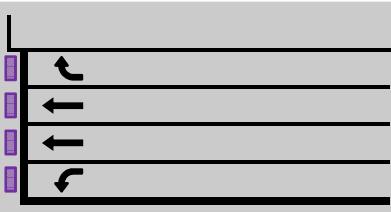
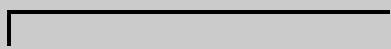
Configuration Table																	
Detector ID	Det. Channel	Phase	Perm. Phase	Overlap	Direction	Enabled	Detection Types		Movement Type	Lane Number	Lane Type	MPH	Dist. From StopBar	Decision Point	Move. Delay	Min Speed Filter	Comment
722014	14	2		False	NB	True	Advanced Count	Advanced Speed	Thru	1	Vehicle	40	350		15	5	was 6 dt 4-5-13
722016	16	6		False	SB	True	Advanced Count	Advanced Speed	Thru	1	Vehicle	40	350		15	5	was 8 dt 4-5-13
722017	17	5		False	NB	True	Stopbar Presence		Left	1	Vehicle						
722018	18	2		False	NB	True	Stopbar Presence		Thru	1	Vehicle	40					
722019	19	2		False	NB	True	Stopbar Presence		Thru	2	Vehicle	40					
722020	20	2		False	NB	True	Stopbar Presence		Thru-Right	1	Vehicle	40					
722021	21	5		False	NB	True	Lane-by-lane Count		Left	1	Vehicle						
722022	22	2		False	NB	True	Lane-by-lane Count		Thru	1	Vehicle	40					3-27-15 - it was WB L1.
722023	23	2		False	NB	True	Lane-by-lane Count		Thru	2	Vehicle	40					3-27-15 - it was WB T1.
722024	24	2		False	NB	True	Lane-by-lane Count		Thru-Right	1	Vehicle	40					3-27-15 - it was WB R1.
722027	27	1		False	SB	True	Stopbar Presence		Left	1	Vehicle						
722028	28	6		False	SB	True	Stopbar Presence		Thru	1	Vehicle	40					
722029	29	6		False	SB	True	Stopbar Presence		Thru	2	Vehicle	40					
722030	30	6		False	SB	True	Stopbar Presence		Thru-Right	1	Vehicle	40					
722031	31	1		False	SB	True	Lane-by-lane Count		Left	1	Vehicle						
722032	32	6		False	SB	True	Lane-by-lane Count		Thru	1	Vehicle	40					
722033	33	6		False	SB	True	Lane-by-lane Count		Thru	2	Vehicle	40					
722034	34	6		False	SB	True	Lane-by-lane Count		Thru	3	Vehicle	40					
722035	35	6		False	SB	True	Lane-by-lane Count		Right	1	Vehicle	40					
722038	38	4		False	EB	True	Stopbar Presence		Left	1	Vehicle						
722039	39	4		False	EB	True	Stopbar Presence		Thru	1	Vehicle						
722040	40	4		False	EB	True	Lane-by-lane Count		Left	1	Vehicle						
722041	41	4		False	EB	True	Lane-by-lane Count		Thru	1	Vehicle						
722042	42	4		False	EB	True	Lane-by-lane Count		Right	1	Vehicle						



DETECTION TYPES

UDOT Automated Traffic Signal Performance Measures

Jamie Mackey, P.E, PTOE
UDOT Statewide Signal Engineer

Detection	Metric
None	 Phase Termination Chart Split Monitor Preemption Details Pedestrian Delay
Lane-by-lane Presence Lane Group Presence	  Purdue Split Failure
Lane-by-lane Stop Bar Count	  Turning Movement Counts Approach Volume
Advanced Count	 Purdue Coordination Diagram Approach Volume
Advanced Speed	 Approach Speed (requires detection with speed service)

Detection – Lane-by-lane Presence

Detector 709519

Det Channel	Lane Number (Lane-by-lane Count)	Date Added
19	1	3/8/2016 12:00:00 AM

Detection Types

- Advanced Count
- Advanced Speed
- Lane-by-lane Count
- Lane-by-lane with Speed Restriction
- Stopbar Presence

Movement Type (Lane-by-lane Count)

- Thru

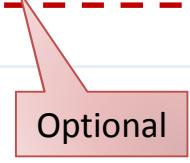
Lane Type (Lane-by-lane Count)

- Vehicle

Detector Comment 

11/16/2016	Added
4:48:04 PM -	3/8/2016

 Date detector added. Currently has no impact but may be used to set the valid dates for the configuration.

 Optional

Detection – Lane-by-lane Count

[Detector 709523](#) [Copy](#) [Delete](#) [X](#)

Det Channel	Lane Number (Lane-by-lane Count)	Date Added
23	1	1/15/2016 3:50:07 PM

Detection Types

- Advanced Count
- Advanced Speed
- Lane-by-lane Count
- Lane-by-lane with Speed Restriction
- Stopbar Presence

Movement Type (Lane-by-lane Count)

Thru

Lane Type (Lane-by-lane Count)

Vehicle

Detector Comment [+](#)

Detection – Lane-by-lane Count w/ Speed Restriction

Detector 709524			Copy  Delete 
Det Channel	Lane Number (Lane-by-lane Count)	Date Added	
24	2	1/15/2016 3:52:45 PM	
Detection Types <input type="checkbox"/> Advanced Count <input type="checkbox"/> Advanced Speed <input type="checkbox"/> Lane-by-lane Count <input checked="" type="checkbox"/> Lane-by-lane with Speed Restriction <input type="checkbox"/> Stopbar Presence	Movement Type (Lane-by-lane Count) Thru	Detector Comment 	
	Lane Type (Lane-by-lane Count) Vehicle		

Optional

Detection – Advanced Count & Speed

Detector 709506
Copy  Delete 

<p>Det Channel</p> <input type="text" value="6"/> <p>Detection Types</p> <p><input checked="" type="checkbox"/> Advanced Count</p> <p><input checked="" type="checkbox"/> Advanced Speed</p> <p><input type="checkbox"/> Lane-by-lane Count</p> <p><input type="checkbox"/> Lane-by-lane with Speed Restriction</p> <p><input type="checkbox"/> Stopbar Presence</p>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%; padding: 5px;">Lane Number (Lane-by-lane Count)</td> <td style="width: 33%; padding: 5px;">Date Added</td> </tr> <tr> <td style="padding: 5px;">1</td> <td style="padding: 5px;">5/9/2016 11:15:57 AM</td> </tr> <tr> <td colspan="2" style="border-top: none; padding: 5px;">Movement Type (Lane-by-lane Count)</td> </tr> <tr> <td colspan="2" style="padding: 5px;">Thru</td> </tr> <tr> <td colspan="2" style="border-top: none; padding: 5px;">Lane Type (Lane-by-lane Count)</td> </tr> <tr> <td colspan="2" style="padding: 5px;">Vehicle</td> </tr> <tr> <td colspan="2" style="border-top: none; padding: 5px;">MPH (Advanced Count, Advanced Speed)</td> </tr> <tr> <td colspan="2" style="padding: 5px;">45</td> </tr> <tr> <td colspan="2" style="border-top: none; padding: 5px;">Distance To Stop Bar (Advanced Count)</td> </tr> <tr> <td colspan="2" style="padding: 5px;">350</td> </tr> <tr> <td colspan="2" style="border-top: none; padding: 5px;">Min Speed Filter (Advanced Speed)</td> </tr> <tr> <td colspan="2" style="padding: 5px;">5</td> </tr> <tr> <td colspan="2" style="border-top: none; padding: 5px;">Decision Point (Advanced Count)</td> </tr> <tr> <td colspan="2" style="padding: 5px;">0</td> </tr> <tr> <td colspan="2" style="border-top: none; padding: 5px;">Movement Delay (Advanced Speed)</td> </tr> <tr> <td colspan="2" style="padding: 5px;">15</td> </tr> </table>	Lane Number (Lane-by-lane Count)	Date Added	1	5/9/2016 11:15:57 AM	Movement Type (Lane-by-lane Count)		Thru		Lane Type (Lane-by-lane Count)		Vehicle		MPH (Advanced Count, Advanced Speed)		45		Distance To Stop Bar (Advanced Count)		350		Min Speed Filter (Advanced Speed)		5		Decision Point (Advanced Count)		0		Movement Delay (Advanced Speed)		15		<p>Detector Comment </p> <p>11/16/2016 4:48:04 PM - 5/09/2016</p>
Lane Number (Lane-by-lane Count)	Date Added																																	
1	5/9/2016 11:15:57 AM																																	
Movement Type (Lane-by-lane Count)																																		
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Lane Type (Lane-by-lane Count)																																		
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5																																		
Decision Point (Advanced Count)																																		
0																																		
Movement Delay (Advanced Speed)																																		
15																																		

Applies only to PCD metric:
Detector distance from stop bar in feet. Detector actuations will be offset to arrival at the stop bar based on the distance and MPH configured.

Optional

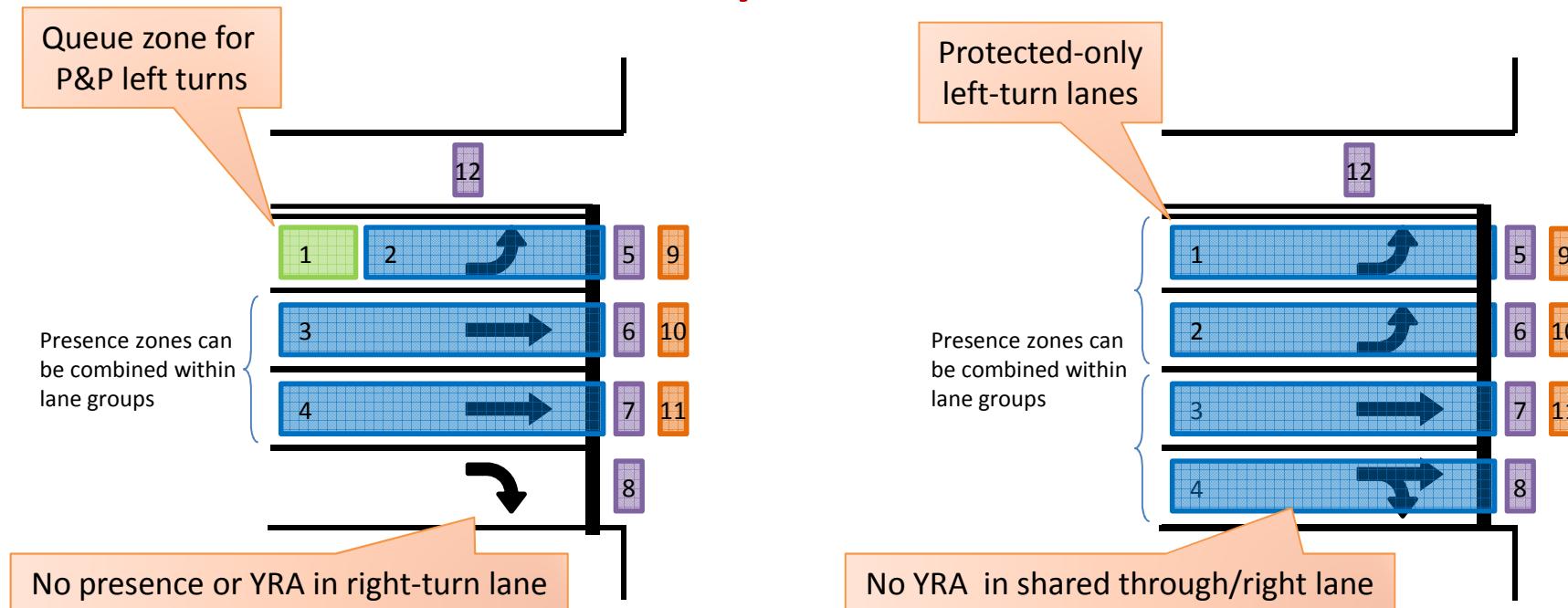
Applies only to PCD metric:
Number of seconds to offset the detector actuations. Usually 0.

Applies only to Speed metric:
Speeds below this number (mph) will not be included in the speed metric.

Applies only to Speed metric:
Number of seconds after start of green to start using speed data. Should be roughly the queue clearance time to the detector. Usually 15s.

Wavetronix Matrix

Standard Detection Layout w/ Click 650



Detection Channel Order

1. Presence zones, inside to outside. If P&P zones, the queue zone is first.
2. Count channels, inside to outside
3. YRA zones, inside to outside
4. Count zones in exit lanes, inside to outside (*often skipped*)

Matrix Sensor Order

1. Phase 2
2. Phase 6
3. Phase 4
4. Phase 8



65' or 50' Presence zone, used for **Split Failure**



15' Presence zone w/ 3-sec delay in controller, not used for SPMs



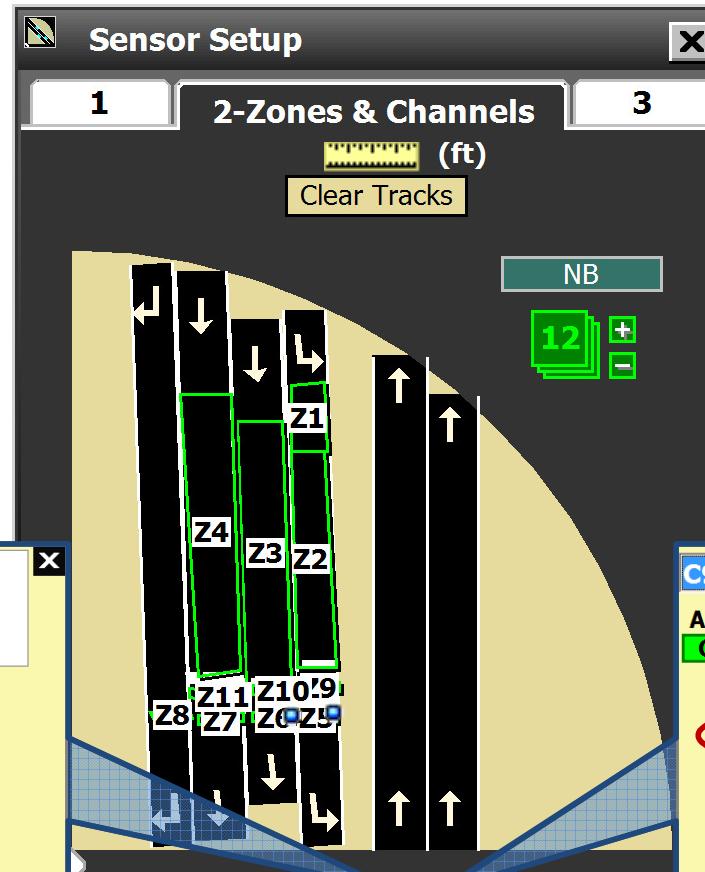
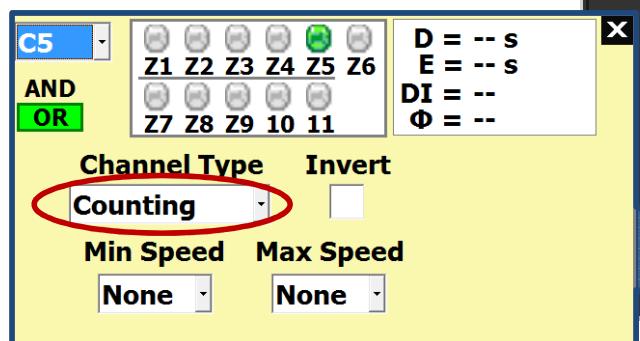
Small zone, used for **Turning Movement Counts**



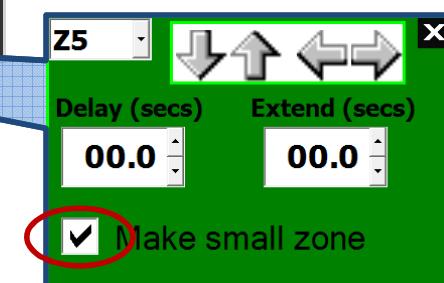
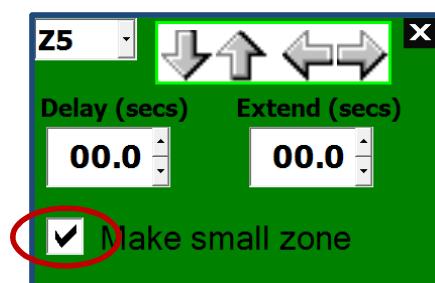
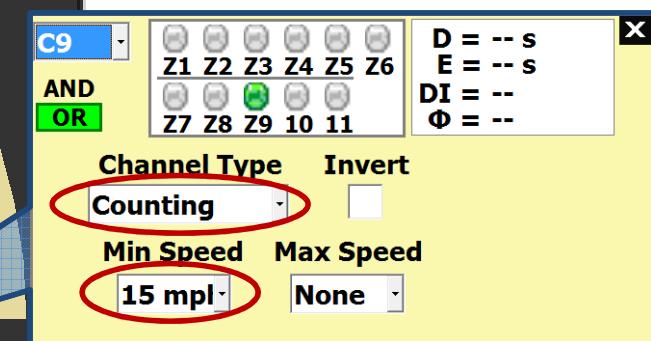
Small zone with 15 mph min speed filter, used for **Yellow & Red Actuations** (Note: Place immediately in front of stop bar and do not use in lanes that permit turns on red)

Wavetronix Matrix Configuration for TMC & YRA

Turning Movement Counts

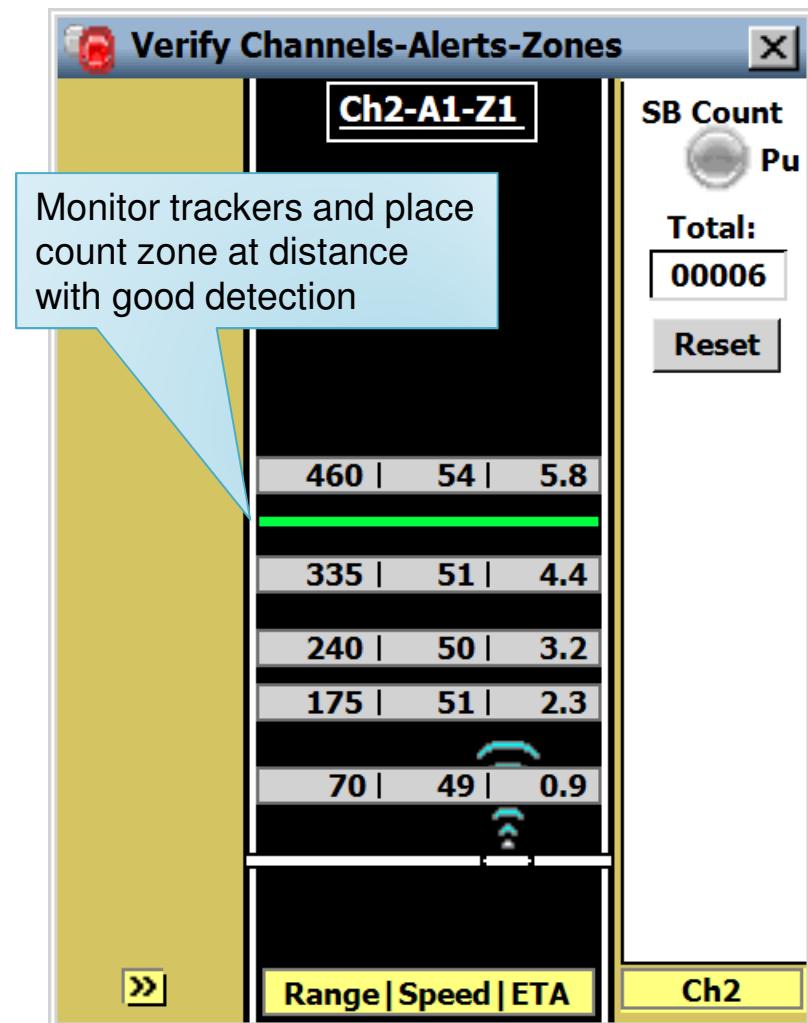
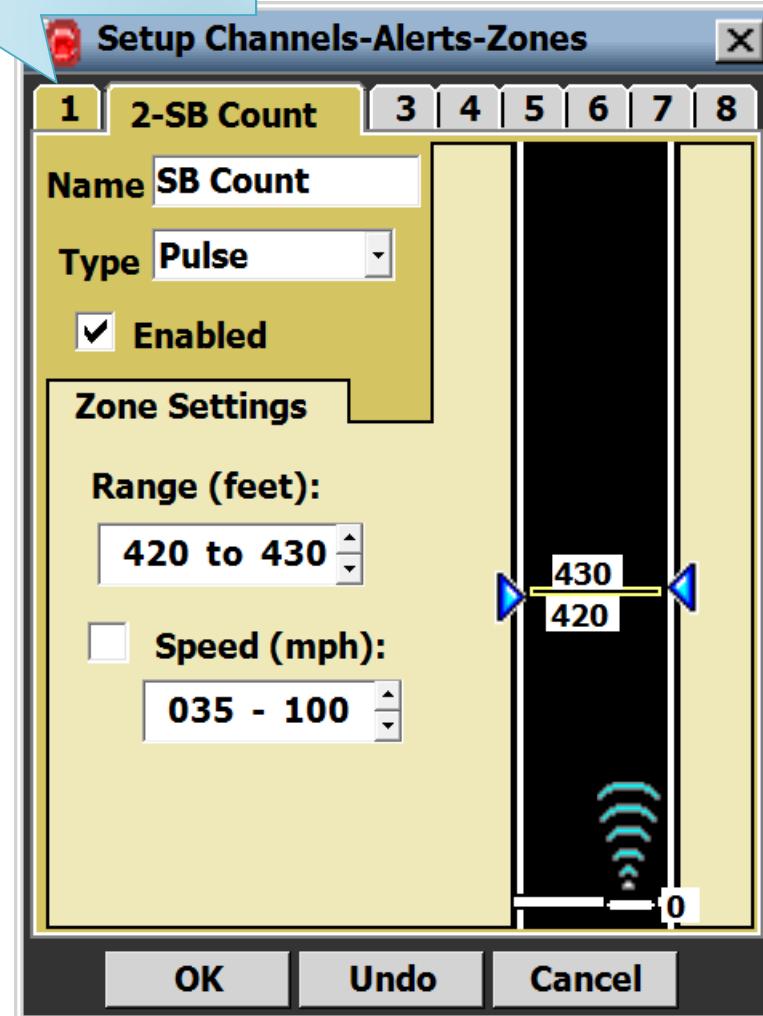


Yellow & Red Actuations



Wavetronix Advance Count Setup

Ch1 is for Dilemma Zone and Queue



Wavetronix Advance Speed Setup

Appendix A. Wavetronix SmartSensor Advance Configuration

In order to use a Wavetronix SmartSensor Advance with the ATSPM Speed Listener, it is necessary to configure the hardware to communicate with the system. There are two components of relevance to ATSPM, a Serial to Ethernet converter and the SmartSensor Device itself. UDOT has used the DIGI PortServer TS 4 serial to Ethernet converter (aka "Digi") in order to retrieve speed data from the Wavetronix SmartSensor Advance; however, other serial to Ethernet converters may work as well.

This appendix only covers configuration specifically related to ATSPM connection using Digi PortServers. For further information on SmartSensor configuration, please contact Wavetronix.

A.1. Serial to Ethernet Converter Configuration

Configure each port pushing speed data on the Digi as follows:

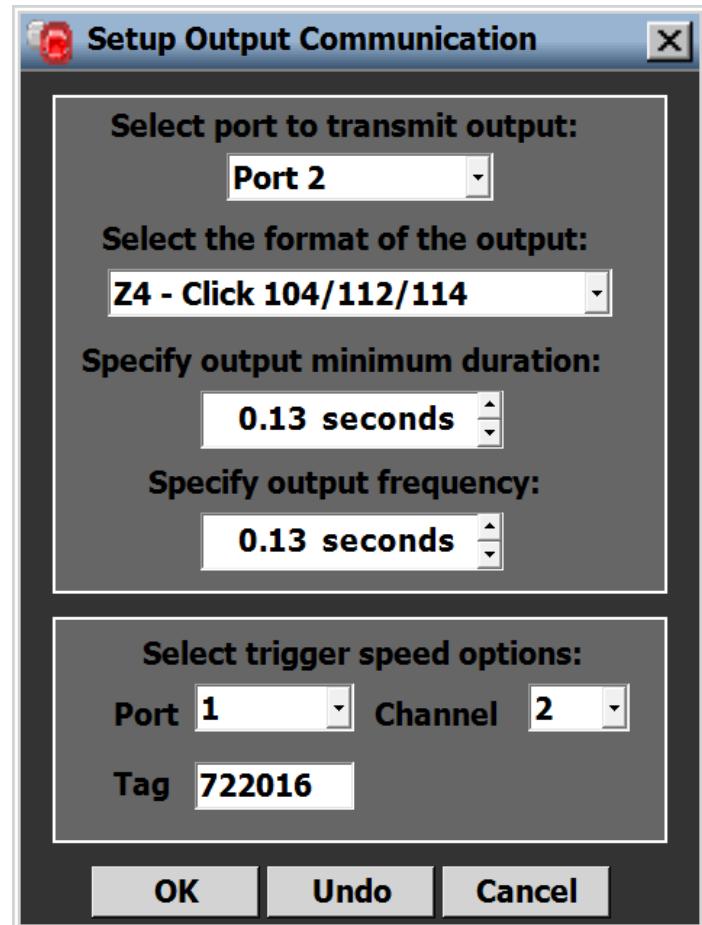
Set the Port Profile to either TCP or UDP Sockets (Select Change Profile to make a change). TCP sockets are preferred as they are more secure, more reliable and are native to the Wavetronix Advance and Matrix SmartSensors (as they are written around TCP internet protocols).

TCP:

- Under the TCP Server Port Security Settings, check the box Only allow network access from the following devices or networks. In the IP Address: box, type in the IP address of the server to receive the data. Under the Advanced Serial Settings Terminal Type: box, type in "vt100", enable Verbose connection status message and enable Enable RTS Toggle with 0 ms for both Pre-delay and Post-delay.
- Click the Apply button.

UDP:

- Under the UDP Client enter the following settings: In the Send data to: box, type the name of the SPM server in Description, its IP address in Send To, "10088" in UDP Port, then click the Add button. Both this IP address and port must be publicly accessible.



Econolite Controllers: Count Detector Setup

Detector	ECPI Log	Phase
1	.	4
2	X	0
3	.	8
4	X	0
5	.	2
6	X	0
7	.	6
8	X	0
9	.	0
10	.	0
11	.	0
12	.	0
13	.	0
14	.	0
15	.	0
16	.	0

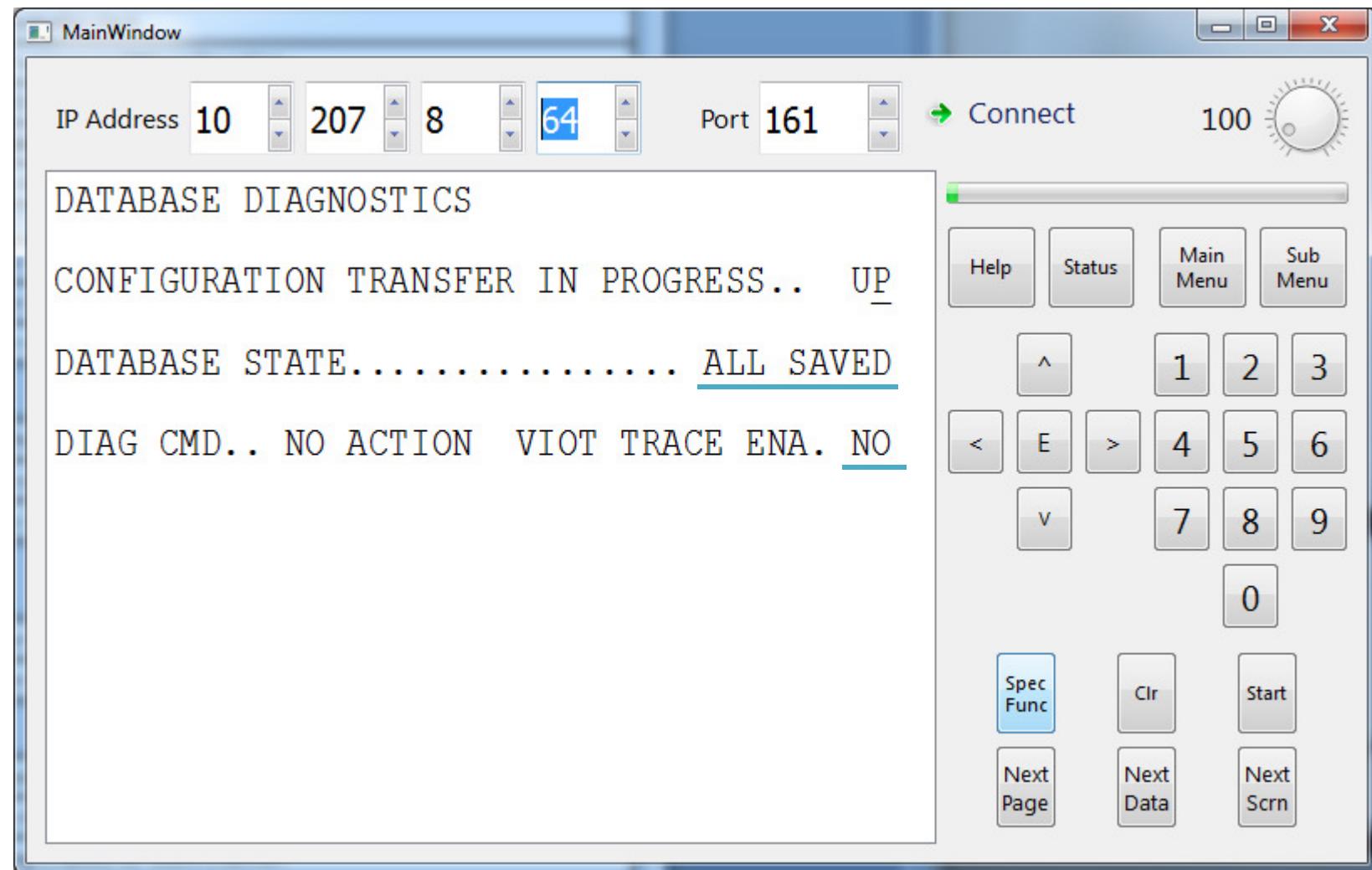
Detector	ECPI Log	Phase
17	.	5
18	.	2
19	.	2
20	.	2
21	.	2
22	X	0
23	X	0
24	X	0
25	X	0
26	X	0
27	.	0
28	.	0
29	.	1
30	.	6
31	.	6
32	.	6

Detector	ECPI Log	Phase
33	.	6
34	X	0
35	X	0
36	X	0
37	X	0
38	X	0
39	.	0
40	.	0
41	.	7
42	.	4
43	.	4
44	.	4
45	X	0
46	X	0
47	X	0
48	X	0

Detector	ECPI Log	Phase
49	.	3
50	.	8
51	.	8
52	.	8
53	X	0
54	X	0
55	X	0
56	X	0
57	.	0
58	.	0
61	.	0
62	.	0
63	.	0
64	.	0

Enable ECPI Log for count zones on channels assigned to Phase 0

Econolite Controllers: Data Logger Setup



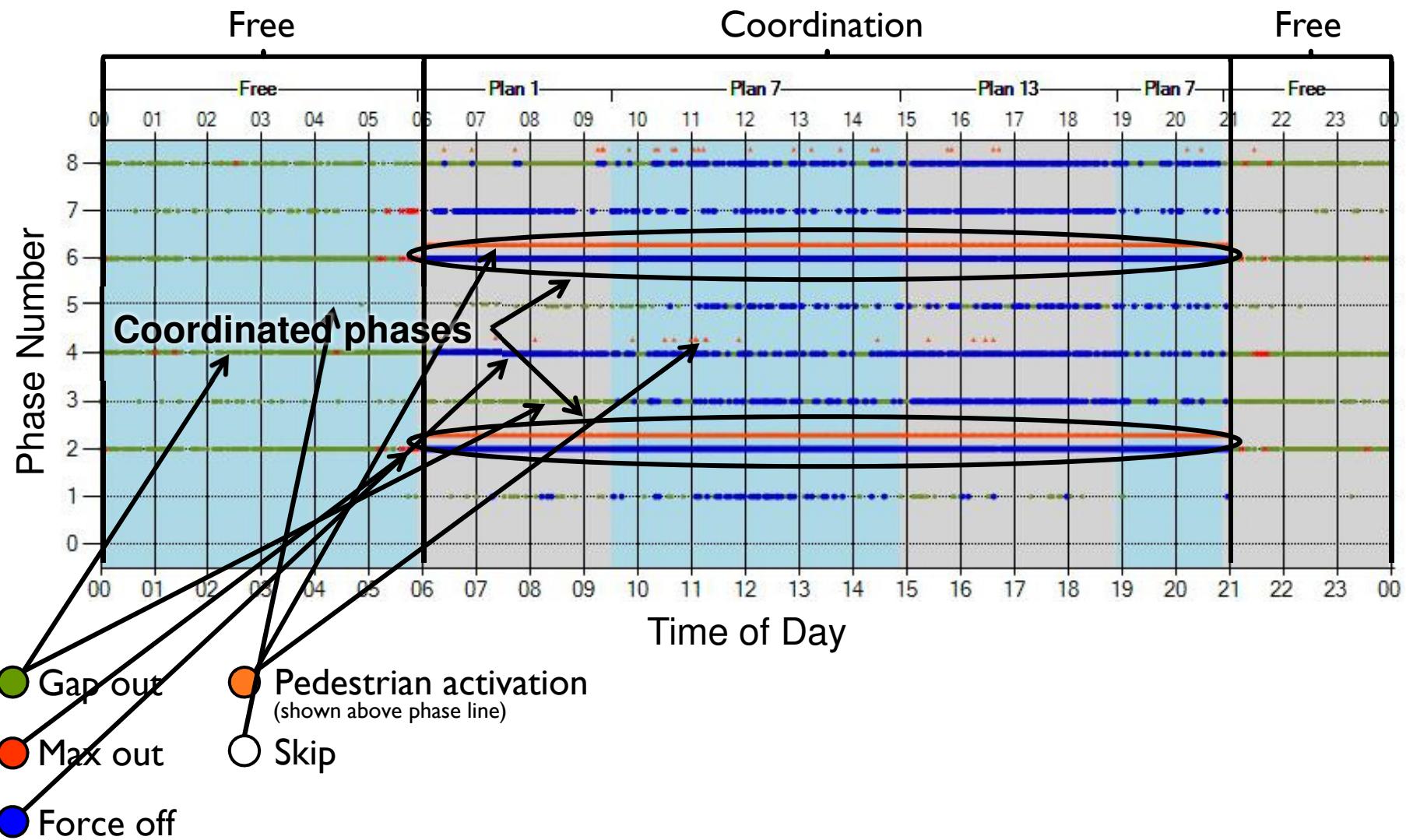


METRICS

UDOT Automated Traffic Signal Performance Measures

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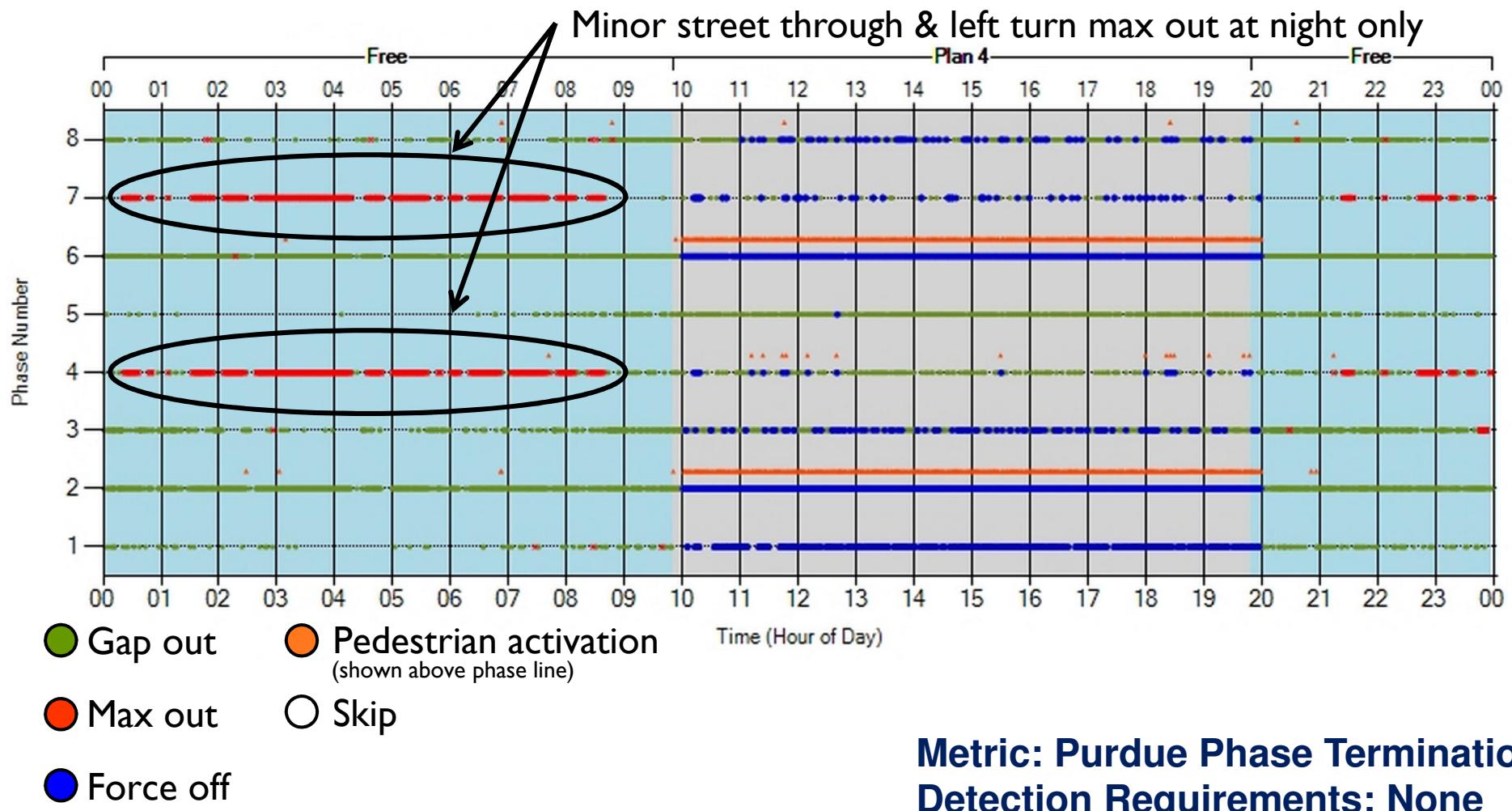
Metric: Phase Termination Chart



Complaint: Long red at 2 a.m., no other traffic

Before

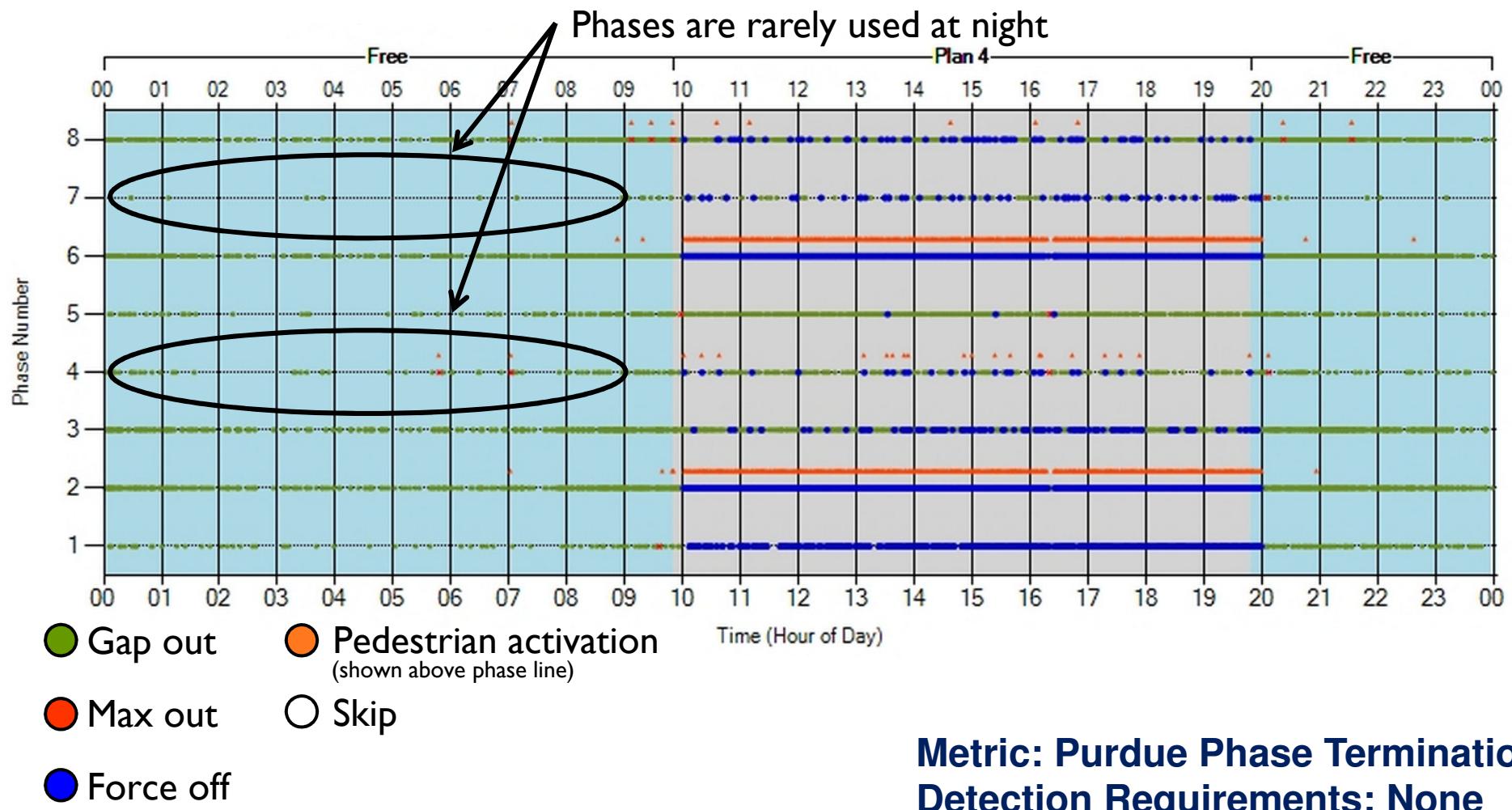
Video detection not working at night



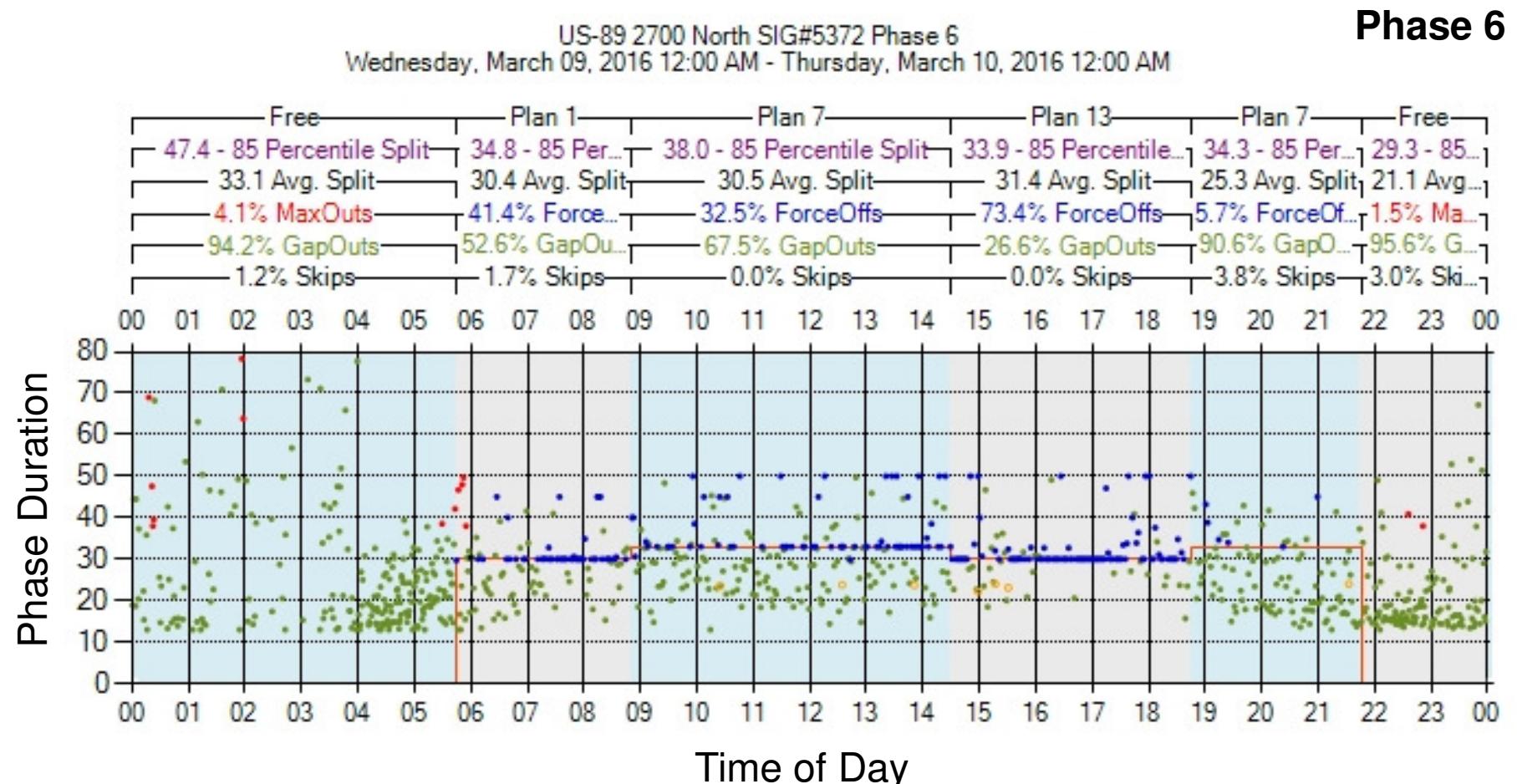
Complaint: Long red at 2 a.m., no other traffic

After

New detection technology installed

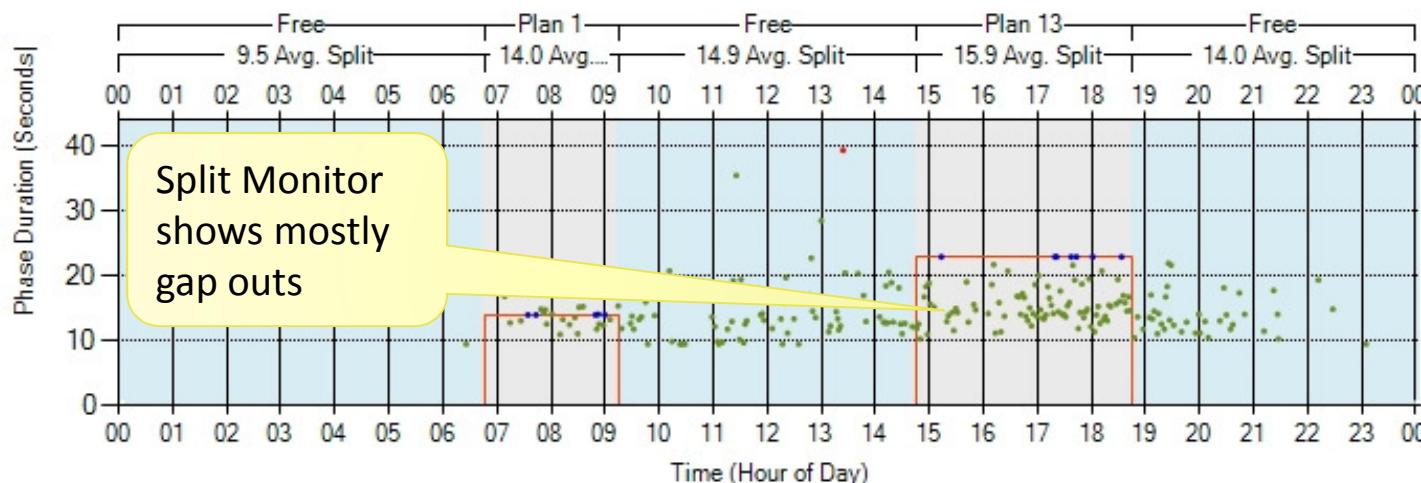


Metric: Split Monitor



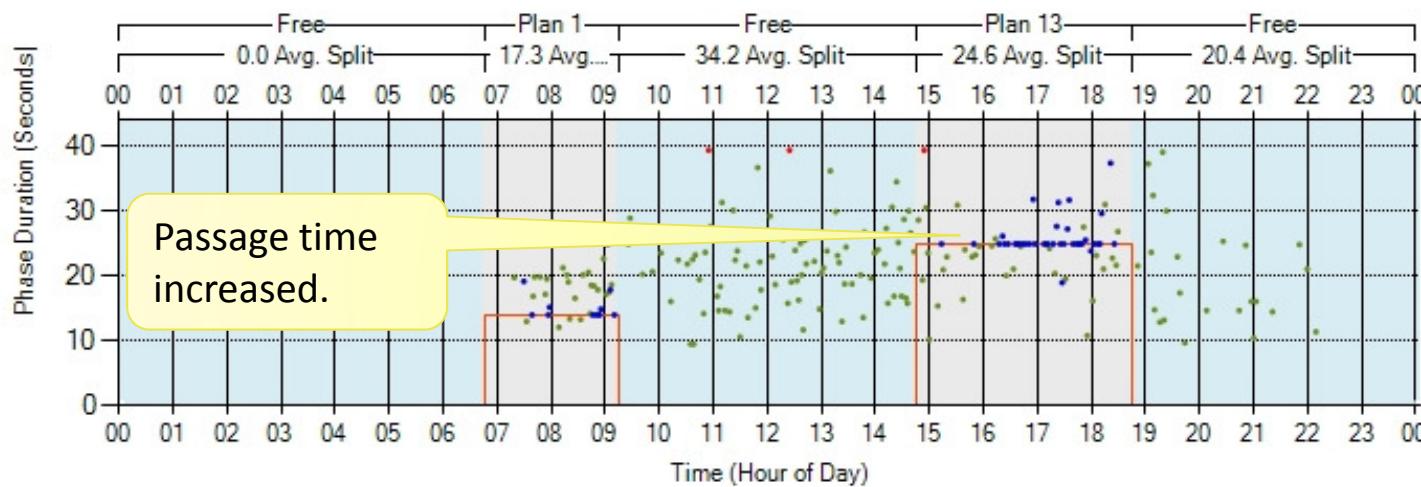
Complaint: Long queue, short green

Bangerter Hwy (SR-154) 13800 South SIG#7355 Phase 1
Wednesday, August 12, 2015 12:00 AM - Wednesday, August 12, 2015 11:59 PM



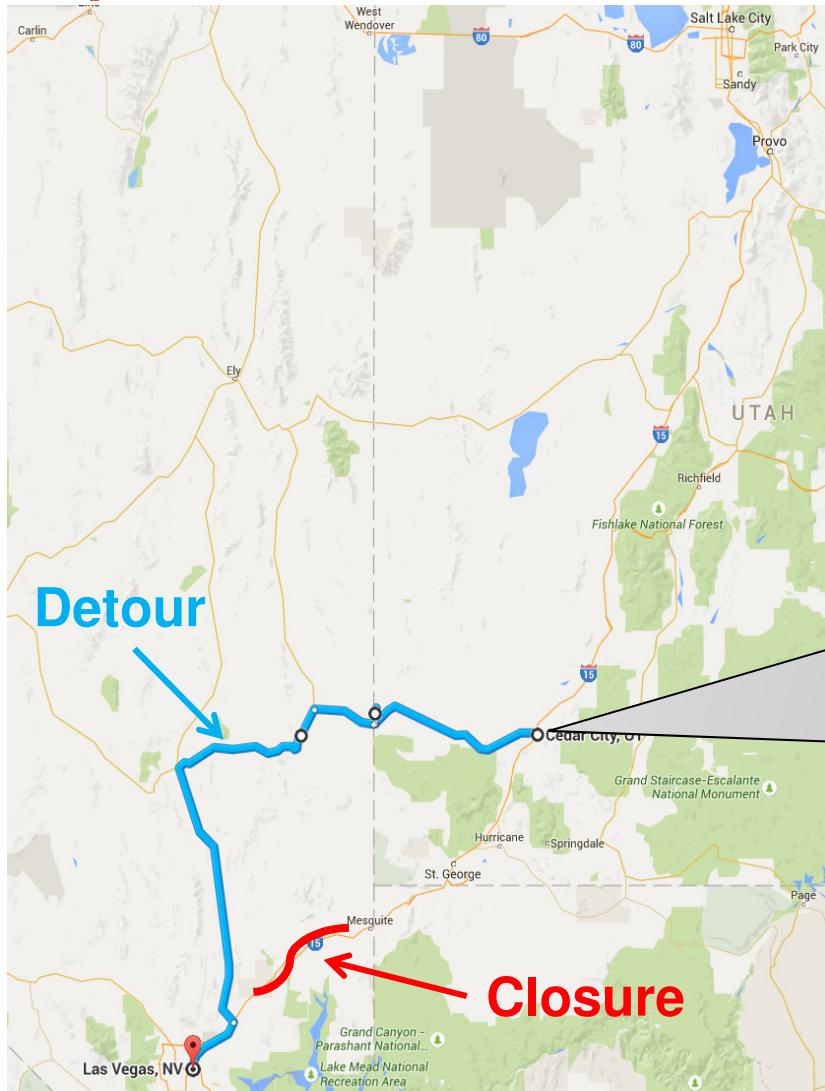
Before

Bangerter Hwy (SR-154) 13800 South SIG#7355 Phase 1
Wednesday, August 10, 2016 12:00 AM - Wednesday, August 10, 2016 11:59 PM



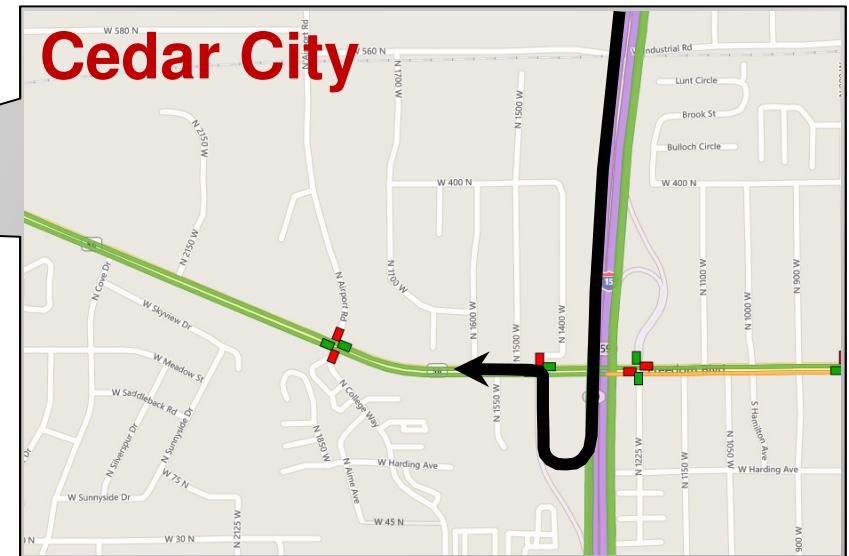
After

Example: I-15 Freeway Closure, September 9-12, 2014

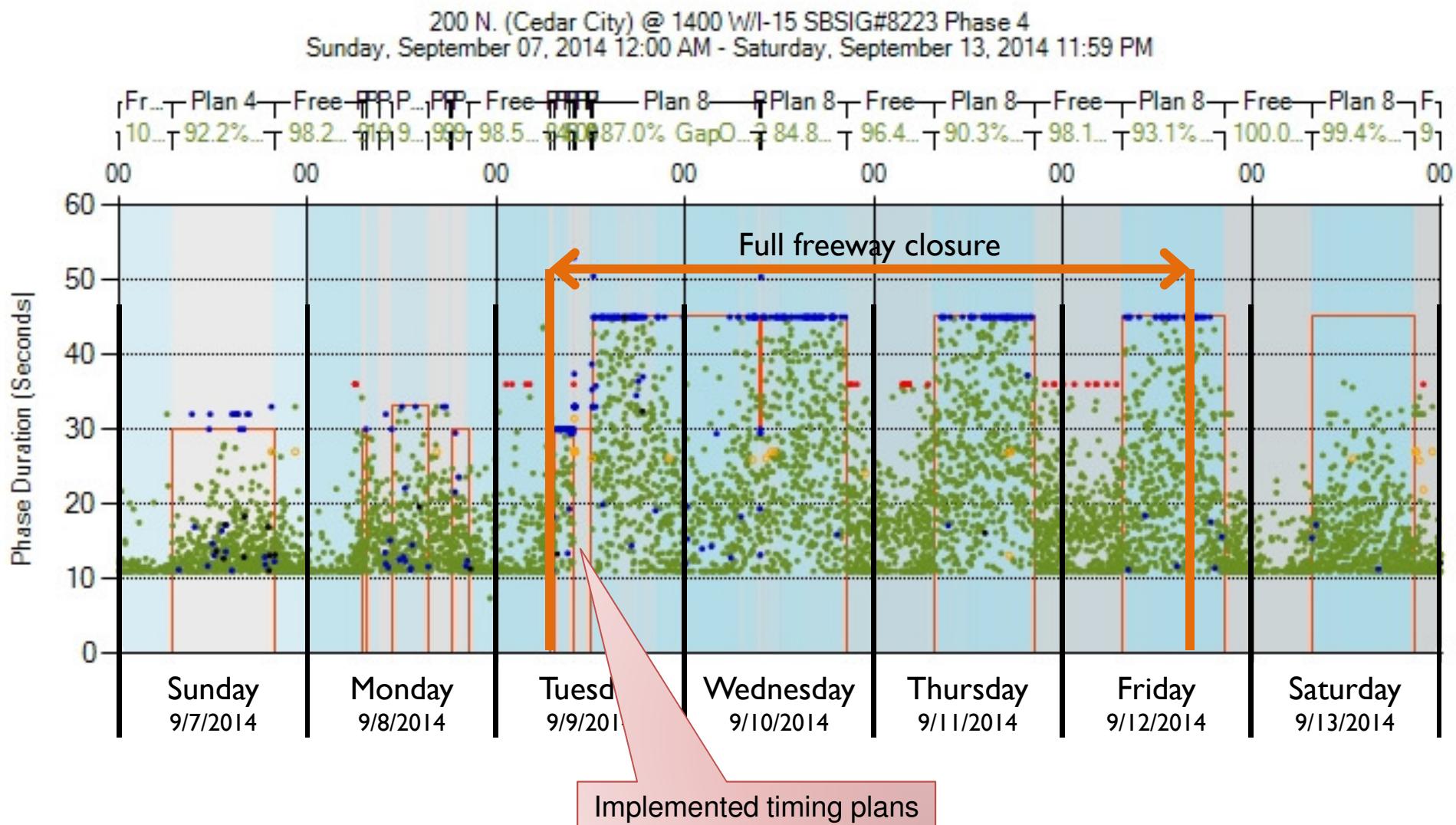


Southbound I-15 Closed in Nevada

- 4-day closure
- Detour to Las Vegas: Exit I-15 in Cedar City



Split Monitor for Incident Management



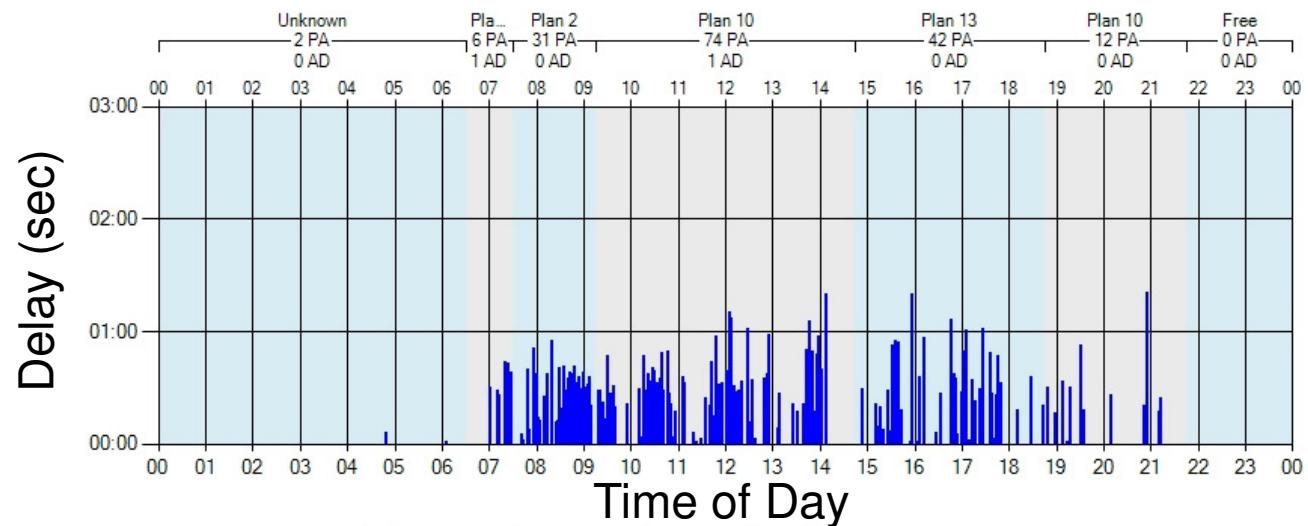
Detection Requirements: None

Metric: Pedestrian Delay

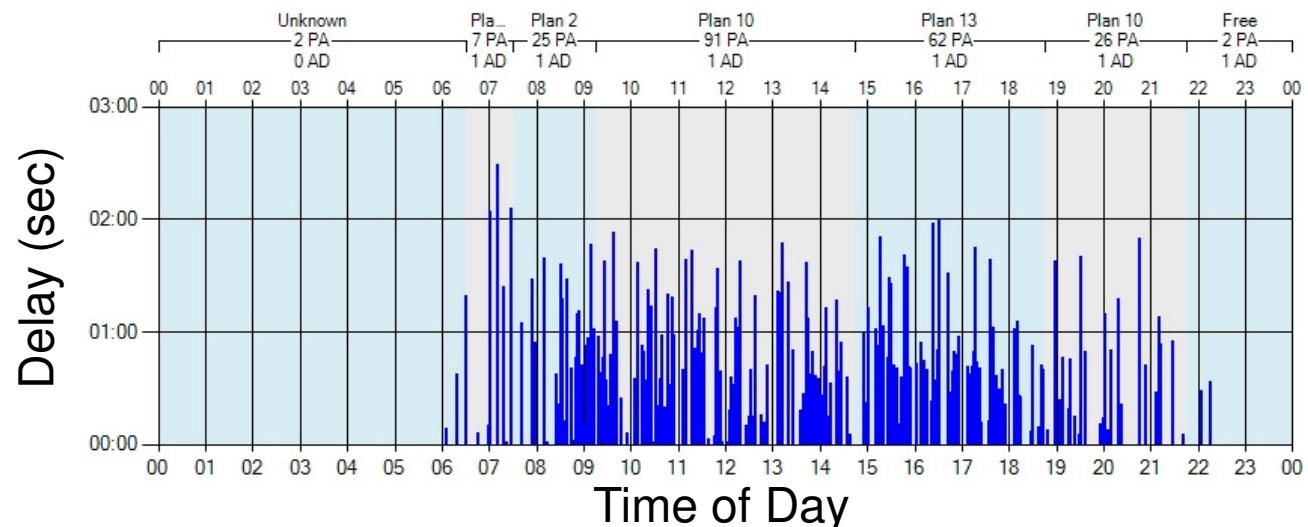
Pedestrian Delay

500 South Guardsman Way (1580 E.) Signal 7216
Tuesday, September 01, 2015 12:00 AM - Wednesday, September 02, 2015 12:00 AM
Phase 2

167-Ped Acutations(PA) 00:00-Min Delay 01:20-Max Delay 00:30-Average Delay(AD)



Phase 4
Side street



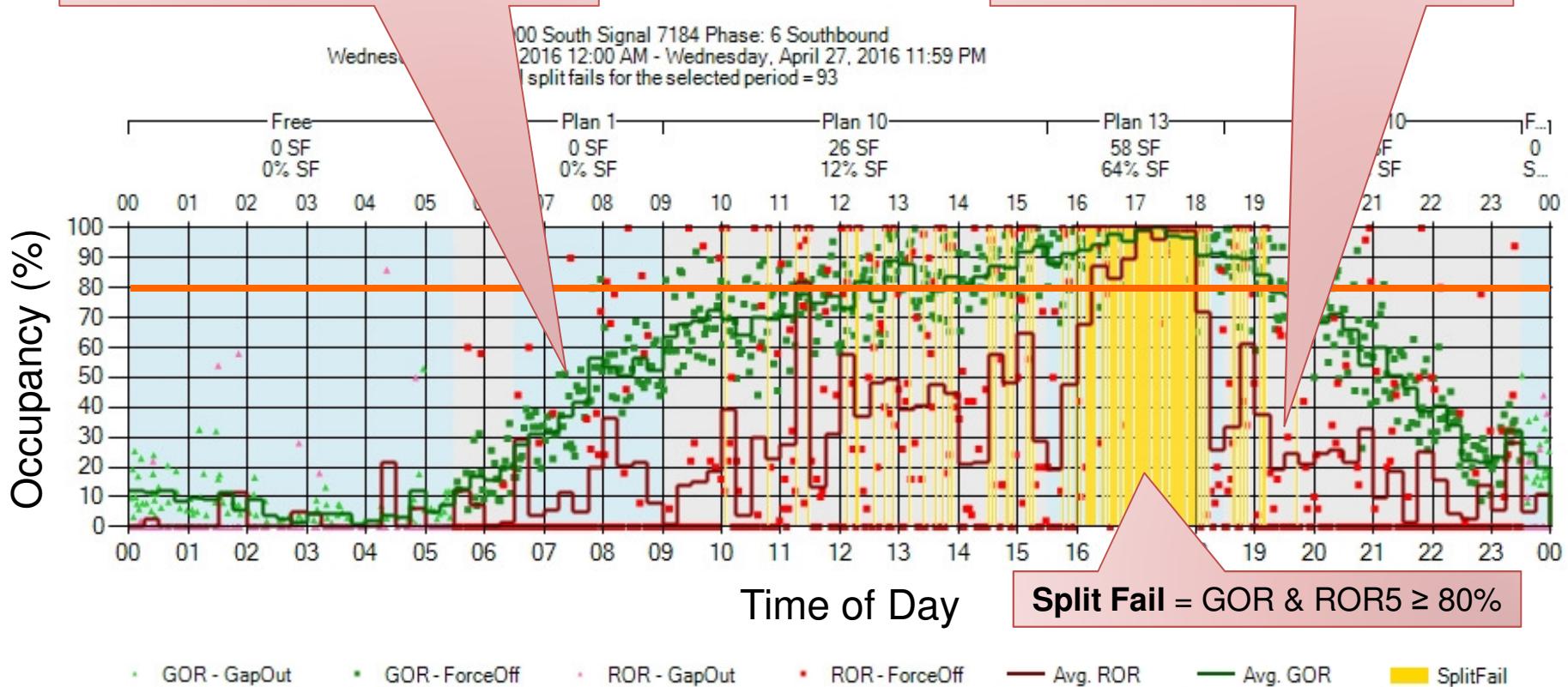
EVENT CODES

45 – Ped Call on
21 – Ped Walk on

Metric: Purdue Split Failure

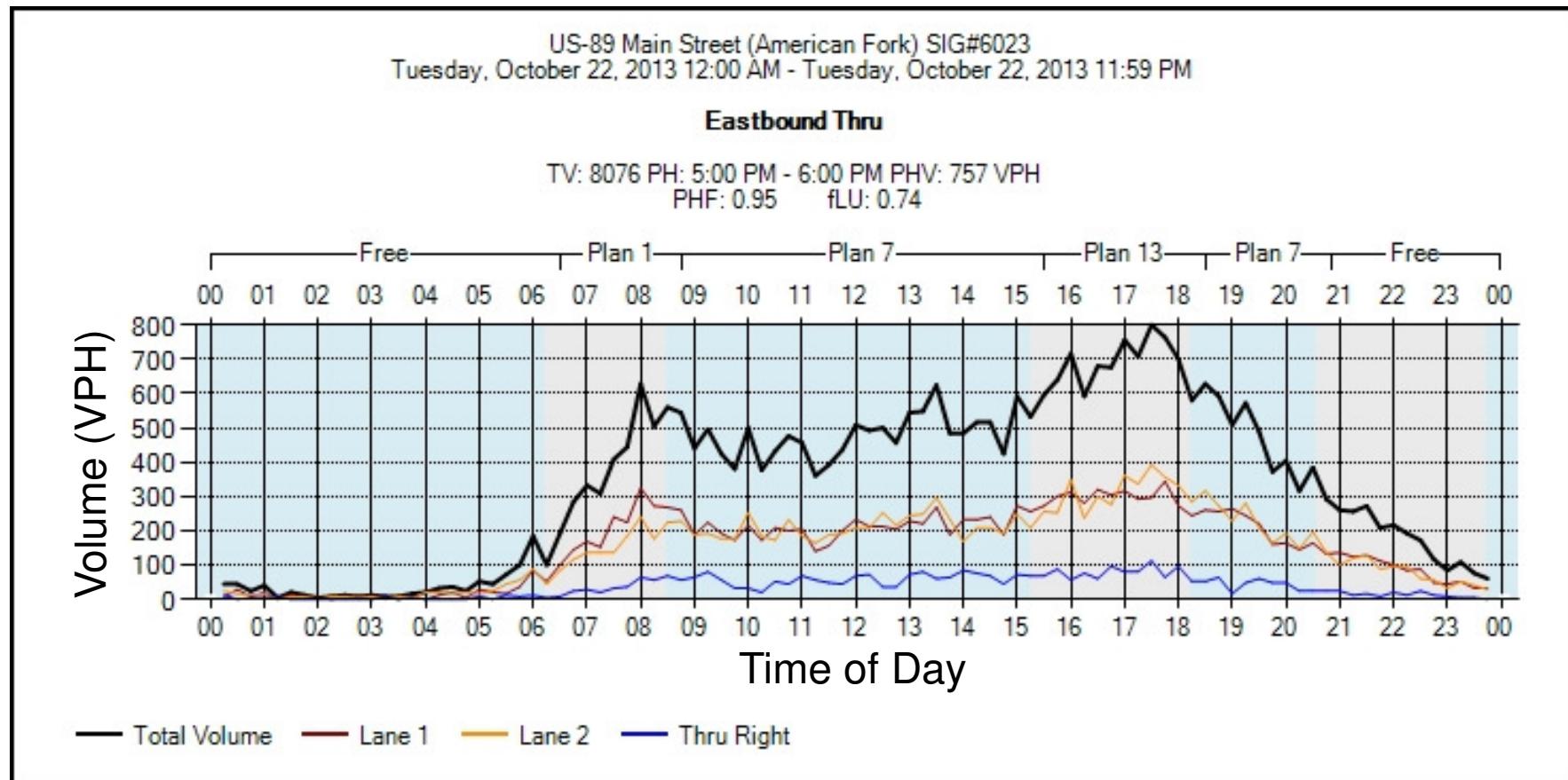
Green Occupancy Ratio (GOR) =
% of time stop bar detector
is ON during GREEN

Red Occupancy Ratio (ROR5) =
% of time stop bar detector
is ON during FIRST 5s of GREEN



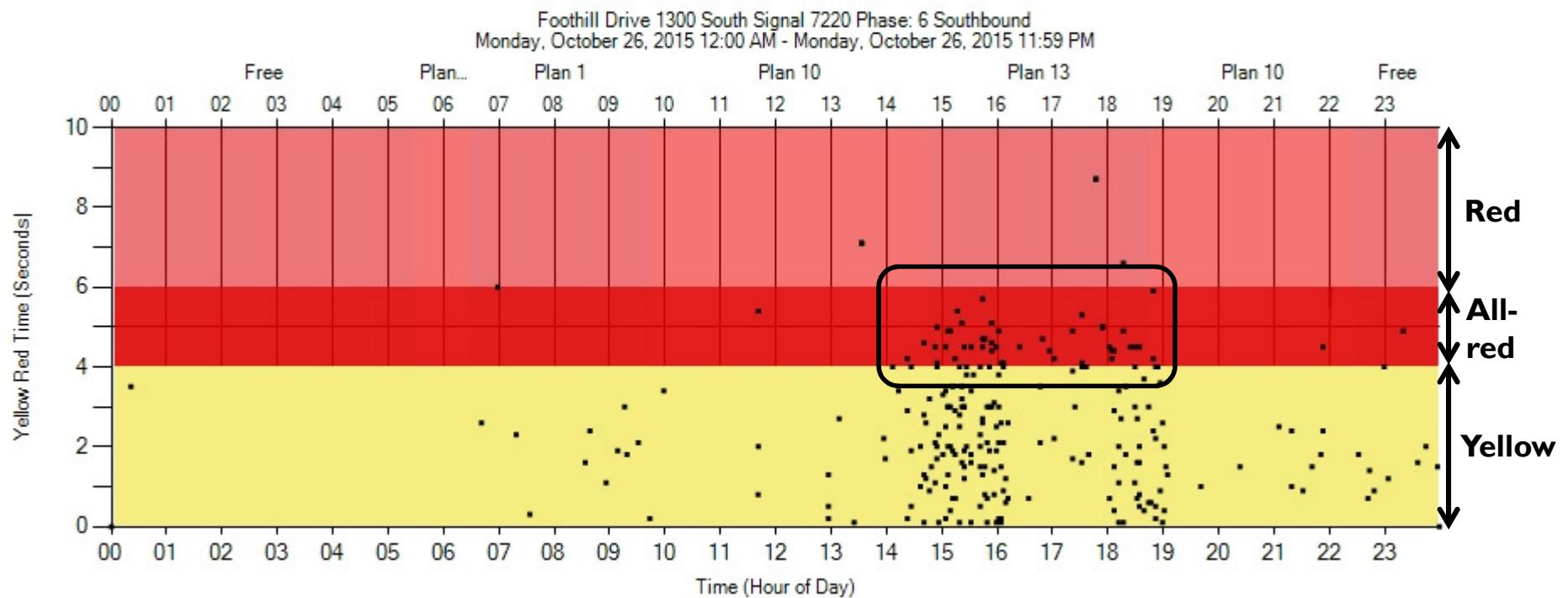
Detection Requirements: Stop bar counts

Metric: Turning Movement Counts



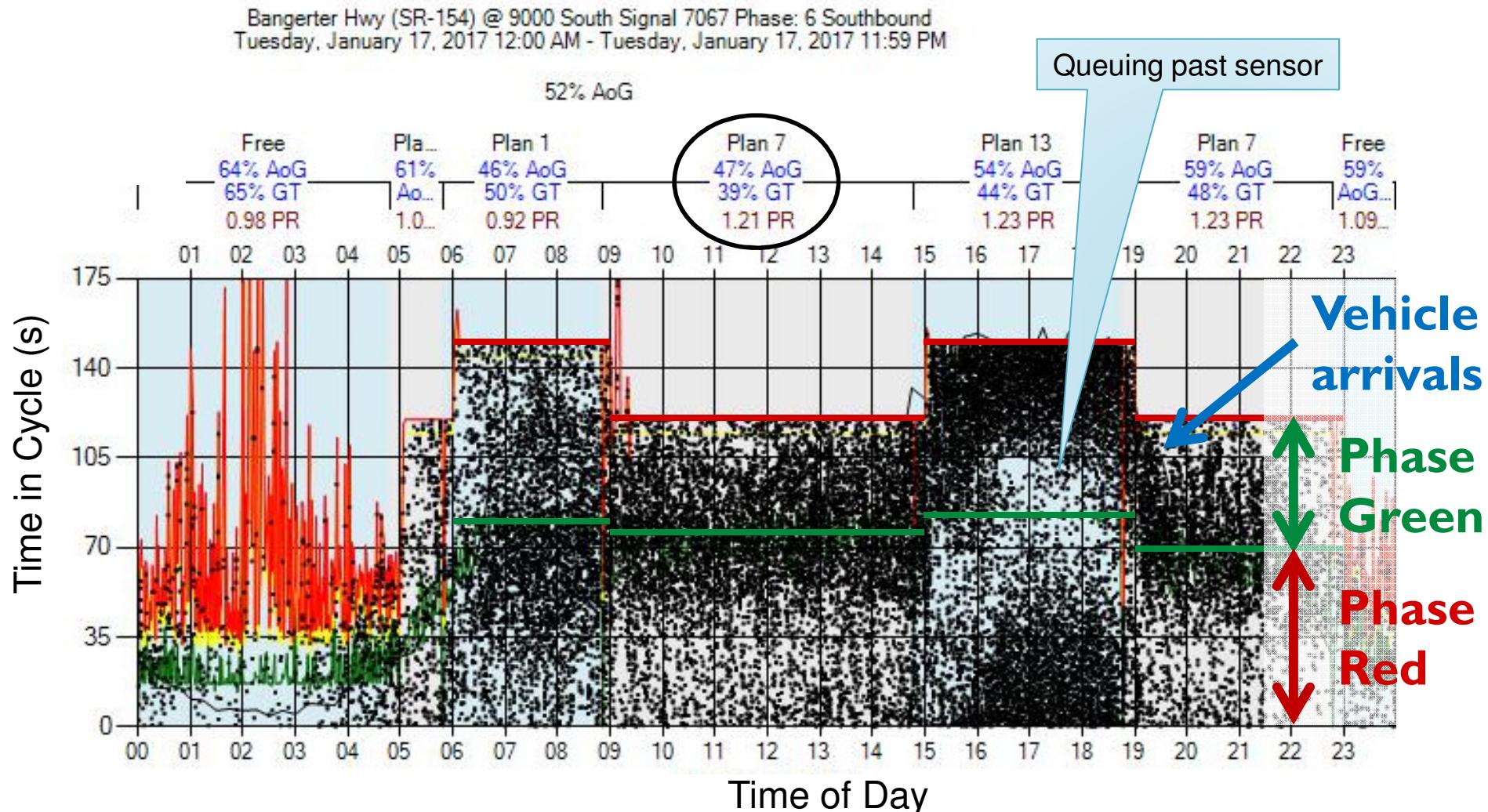
Metric: Turning Movement Counts
Detection Requirements: Stop Bar Counters

Yellow & Red Actuations

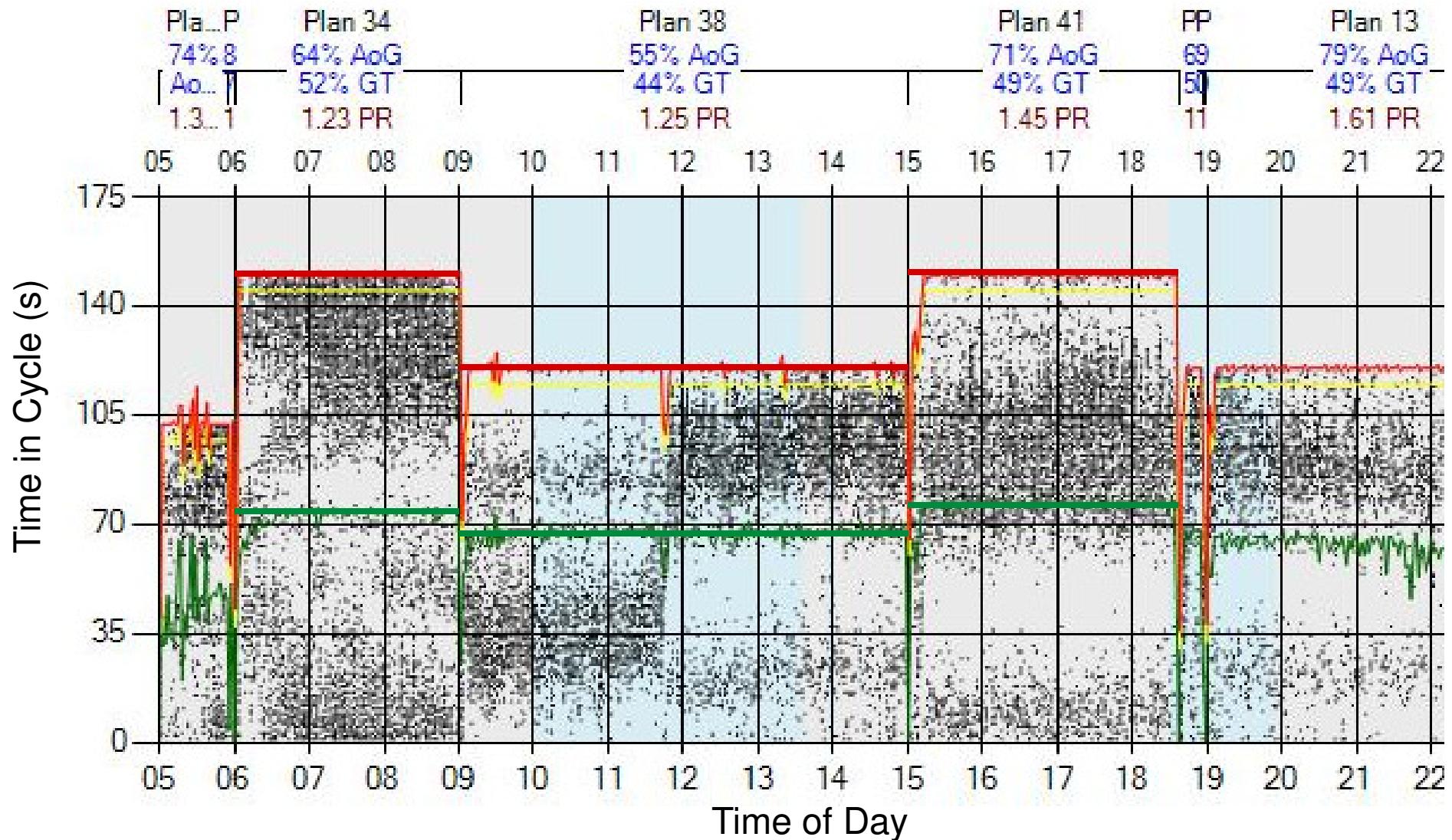


- Is green time too short? – Would increasing the split fix the problem?
- Is coordination poor? – Would more vehicles arriving on green fix this?
- Is sight distance poor? – Are there trucks or other obstructions blocking signal?
- Is law enforcement needed? – Time can be pinned down for law enforcement.

Metric: Purdue Coordination Diagram



Optimization Example: Progression Quality

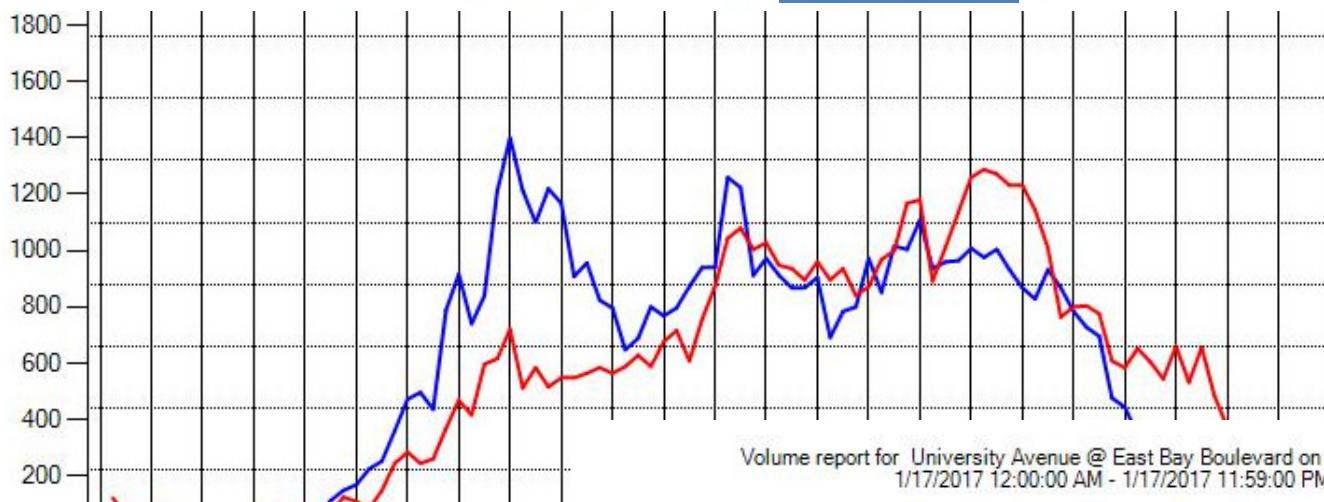


Detection Requirements: Stop bar counts or approach counts

Metric: Approach Volume

— Northbound
— Southbound

Volume report for University Avenue @ East Bay Boulevard on the Northbound and Southbound approaches.
1/17/2017 12:00:00 AM - 1/17/2017 11:59:00 PM - Using Advanced Detection



Volume report for University Avenue @ East Bay Boulevard on the Northbound and Southbound approaches.
1/17/2017 12:00:00 AM - 1/17/2017 11:59:00 PM - Using Stop Bar Detection

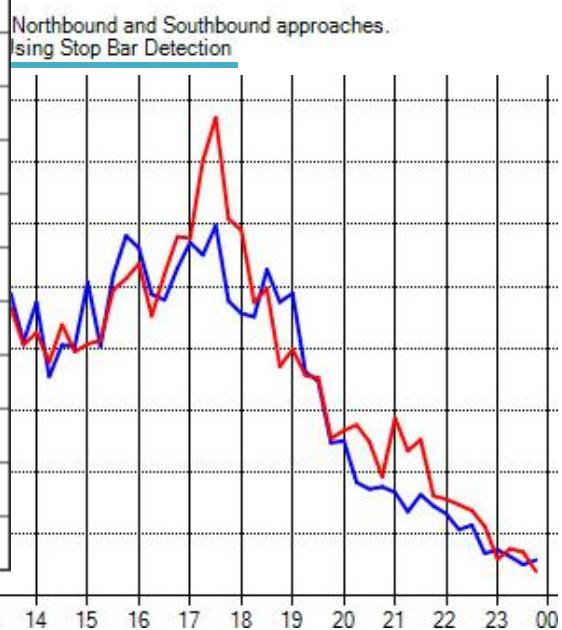


Detection Requirements: Stop bar counts or approach counts

Metric: Approach Volume



Metric	Value
Peak Hour	1/17/2017 4:45:00 PM
Peak Hour Factor	0.362
Peak Hour Volume	10744
Peak Hour Factor	0.891
Total Volume	29653
Northbound Peak Hour	7:45 AM - 8:45 AM
Northbound Peak Hour D Value	0.408
Northbound Peak Hour K Value	0.371
Northbound Peak Hour Volume	6048
Northbound Peak Hour Factor	0.894
Northbound Total Volume	
Southbound Peak Hour	5:15 PM - 6:15 PM
Southbound Peak Hour D Value	0.778
Southbound Peak Hour K Value	0.441
Southbound Peak Hour Volume	5888
Southbound Peak Hour Factor	0.866
Southbound Total Volume	



Detection Requirements: Approach counts

Metric: Approach Delay

— Approach Delay
— Approach Delay Per Vehicle

University Avenue @ East Bay Boulevard Signal 6402 Phase: 2 Northbound
Tuesday, January 17, 2017 12:00 AM - Tuesday, January 17, 2017 11:59 PM

Average Delay Per Vehicle = 13 Seconds.
Total Delay For Selected Period = 178416 Seconds

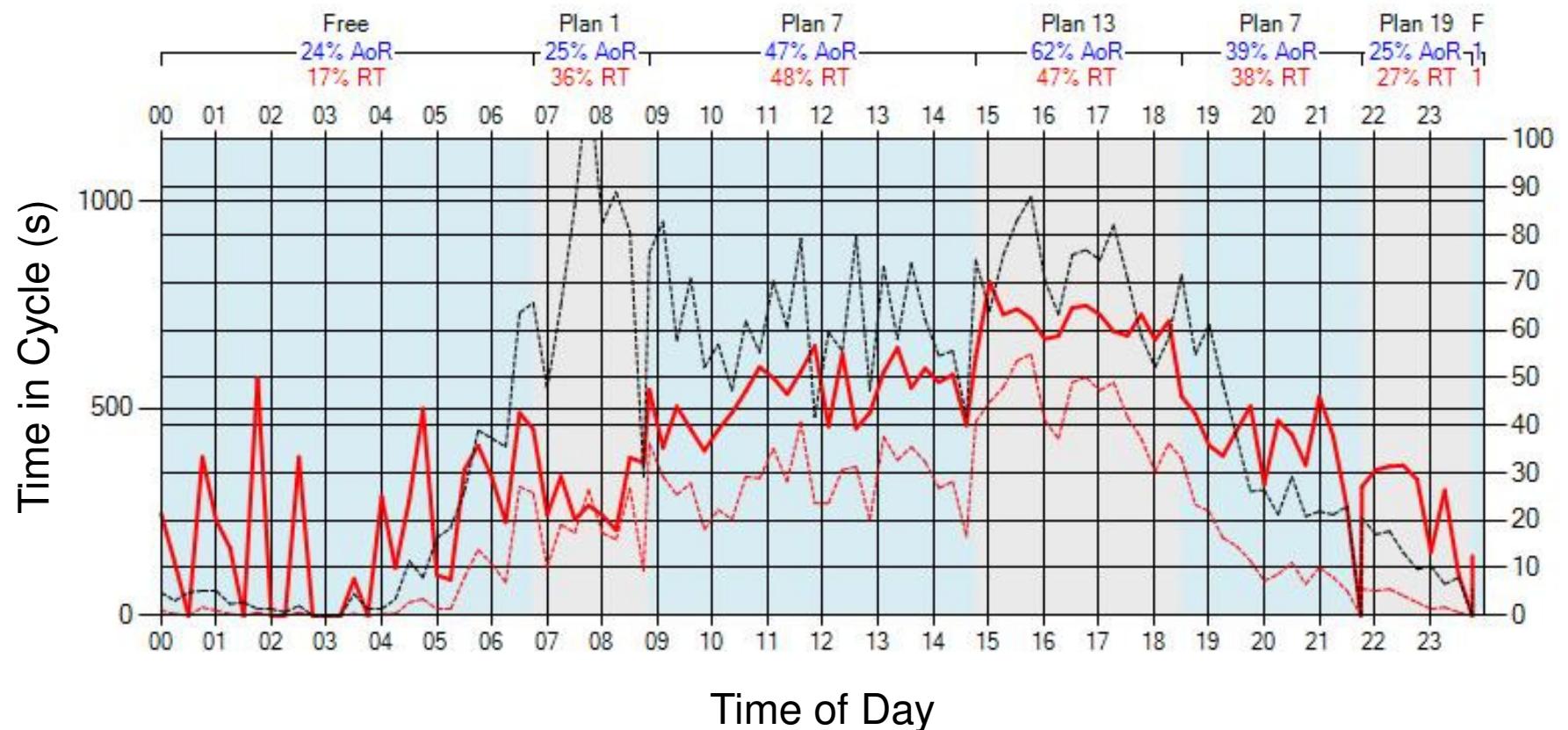


Simplified Approach Delay. Displays time between approach activation during the red phase and when the phase turns green.
Does NOT account for start up delay, deceleration, or queue length that exceeds the detection zone.

Metric: Arrivals on Red

University Avenue @ East Bay Boulevard Signal 6402 Phase: 2 Northbound
 Tuesday, January 17, 2017 12:00 AM - Tuesday, January 17, 2017 11:59 PM

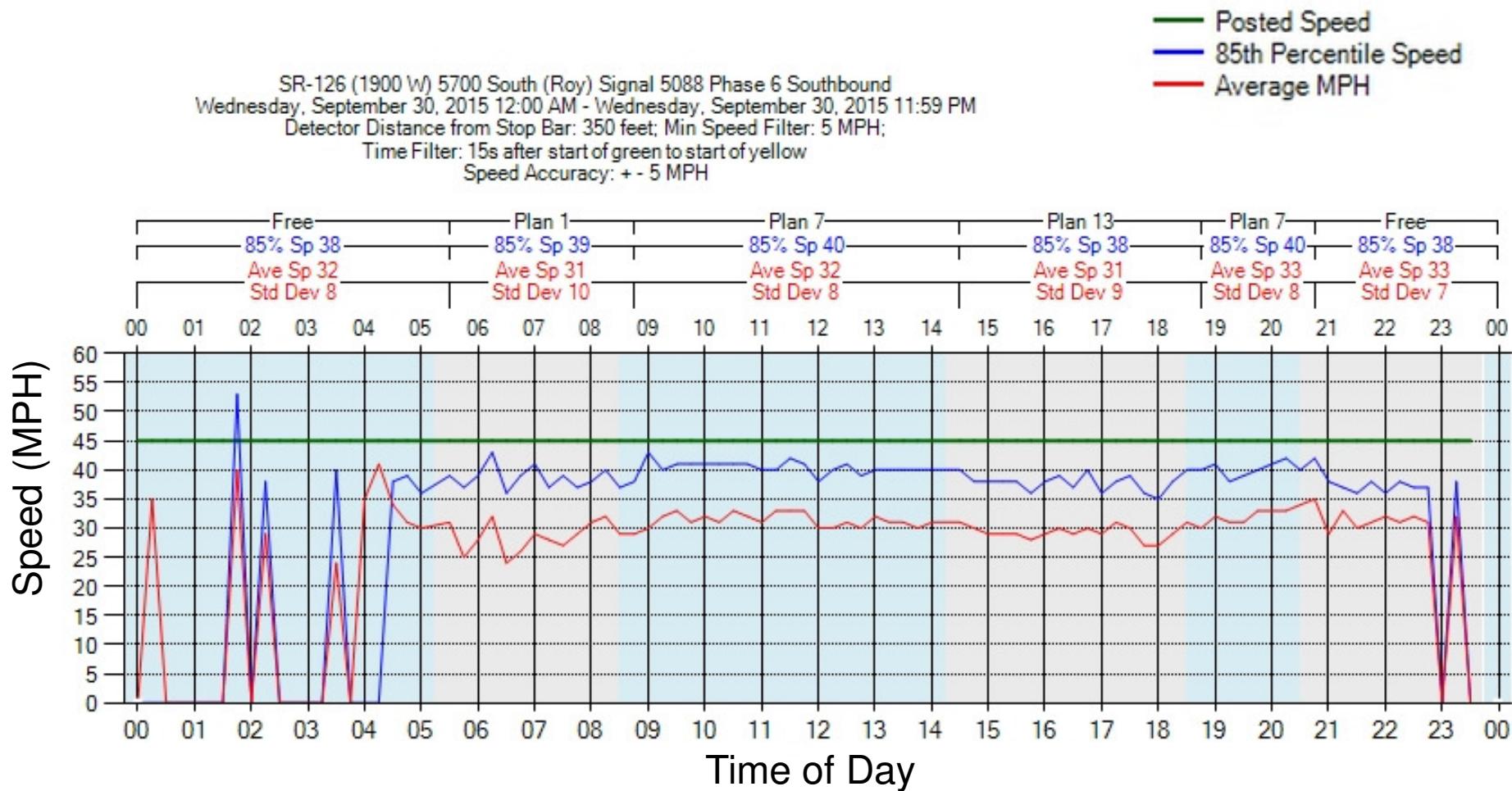
Total Detector Hits = 11725 Total AoR = 5170
 Percent AoR for the select period = 44



Detection Requirements: Approach speed

Metric: Approach Speed

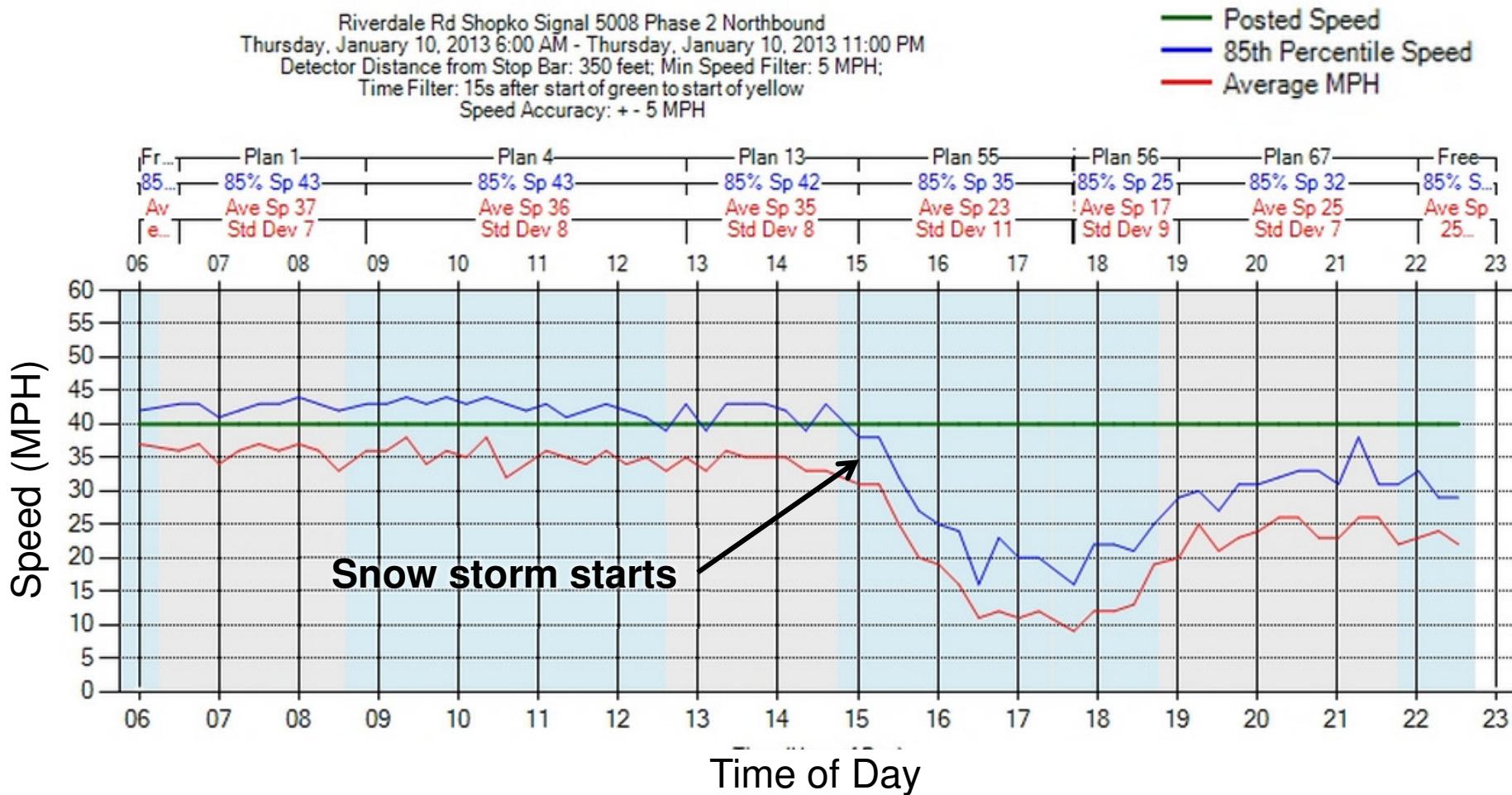
SR-126 (1900 W) 5700 South (Roy) Signal 5088 Phase 6 Southbound
 Wednesday, September 30, 2015 12:00 AM - Wednesday, September 30, 2015 11:59 PM
 Detector Distance from Stop Bar: 350 feet; Min Speed Filter: 5 MPH;
 Time Filter: 15s after start of green to start of yellow
 Speed Accuracy: + - 5 MPH



Detection Requirements: Approach speed

Metric: Approach Speed

Riverdale Rd Shopko Signal 5008 Phase 2 Northbound
 Thursday, January 10, 2013 6:00 AM - Thursday, January 10, 2013 11:00 PM
 Detector Distance from Stop Bar: 350 feet; Min Speed Filter: 5 MPH;
 Time Filter: 15s after start of green to start of yellow
 Speed Accuracy: +/- 5 MPH





ROUTE CONFIGURATION

UDOT Automated Traffic Signal Performance Measures

Jamie Mackey, P.E, PTOE
UDOT Statewide Signal Engineer

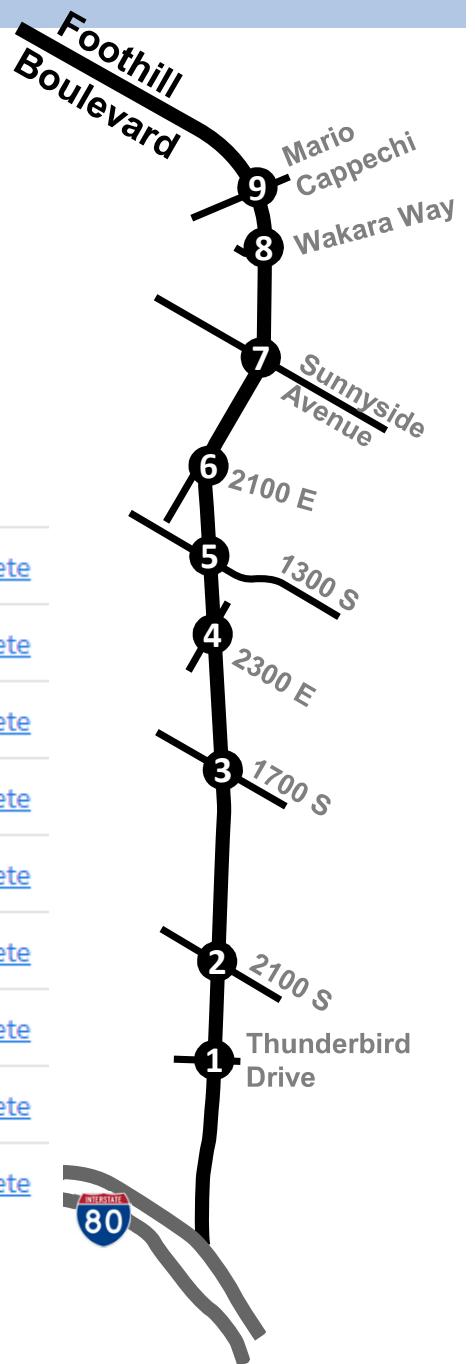
Route Configuration for Link Pivot

R2: Foothill Blvd

[Create New](#)

ApproachRouteDescription	ApproachOrder	
7371 - Foothill Drive Thunderbird Northbound Phase 2	1	Edit Details Delete
7223 - Foothill Drive 2100 South Northbound Phase 2	2	Edit Details Delete
7222 - Foothill Drive 1700 South Northbound Phase 2	3	Edit Details Delete
7221 - Foothill Drive 2300 East Northbound Phase 2	4	Edit Details Delete
7220 - Foothill Drive 1300 South Northbound Phase 2	5	Edit Details Delete
7503 - Foothill Drive 2100 East Northbound Phase 2	6	Edit Details Delete
7219 - Foothill Drive Sunnyside Northbound Phase 2	7	Edit Details Delete
7218 - Foothill Drive Wakara Way (660 S.) Northbound Phase 2	8	Edit Details Delete
7217 - Foothill Drive Mario Capecchi Dr (1950 E.) Northbound Phase 2	9	Edit Details Delete

Direction of travel
to next signal



Purdue Link Pivot

Purdue Link Pivot Analysis

Report Options

Route
R2: Foothill Blvd

Signals

Cycle Length
120

Start Date
01/12/2017

End Date
01/12/2017

Start Time
11 AM ▾

End Time
1 PM ▾

Advanced

Days to Include

Sunday
 Monday
 Tuesday
 Wednesday
 Thursday
 Friday
 Saturday

Starting Point
Downstream ▾

Bias
0

Bias Direction
Downstream ▾

Purdue Link Pivot

Adjustments

Link	Signal	Location	Link Delta	Edit Link Delta	Offset(+ to Offset)	Existing Offset	New Offset
1	7371	Foothill Drive Thunderbird	4	4	55	0	55
2	7223	Foothill Drive 2100 South	7	7	51	0	51
3	7222	Foothill Drive 1700 South	0	0	44	0	44
4	7221	Foothill Drive 2300 East	0	0	44	0	44
5	7220	Foothill Drive 1300 South	40	40	44	0	44
6	7503	Foothill Drive 2100 East	59	59	4	0	4
7	7219	Foothill Drive Sunnyside	56	56	65	0	65
8	7218	Foothill Drive Wakara Way (660 S.)	9	9	9	0	9
9	7217	Foothill Drive Mario Capecchi Dr (1950 E.)	0	0	0	0	0

Customizable link delta

Final offsets

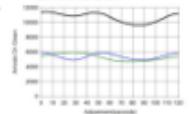
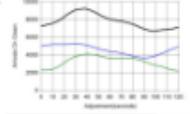
Recommended link delta

Change to offset (link delta propagated up corridor)

User-input existing programmed offsets

Purdue Link Pivot

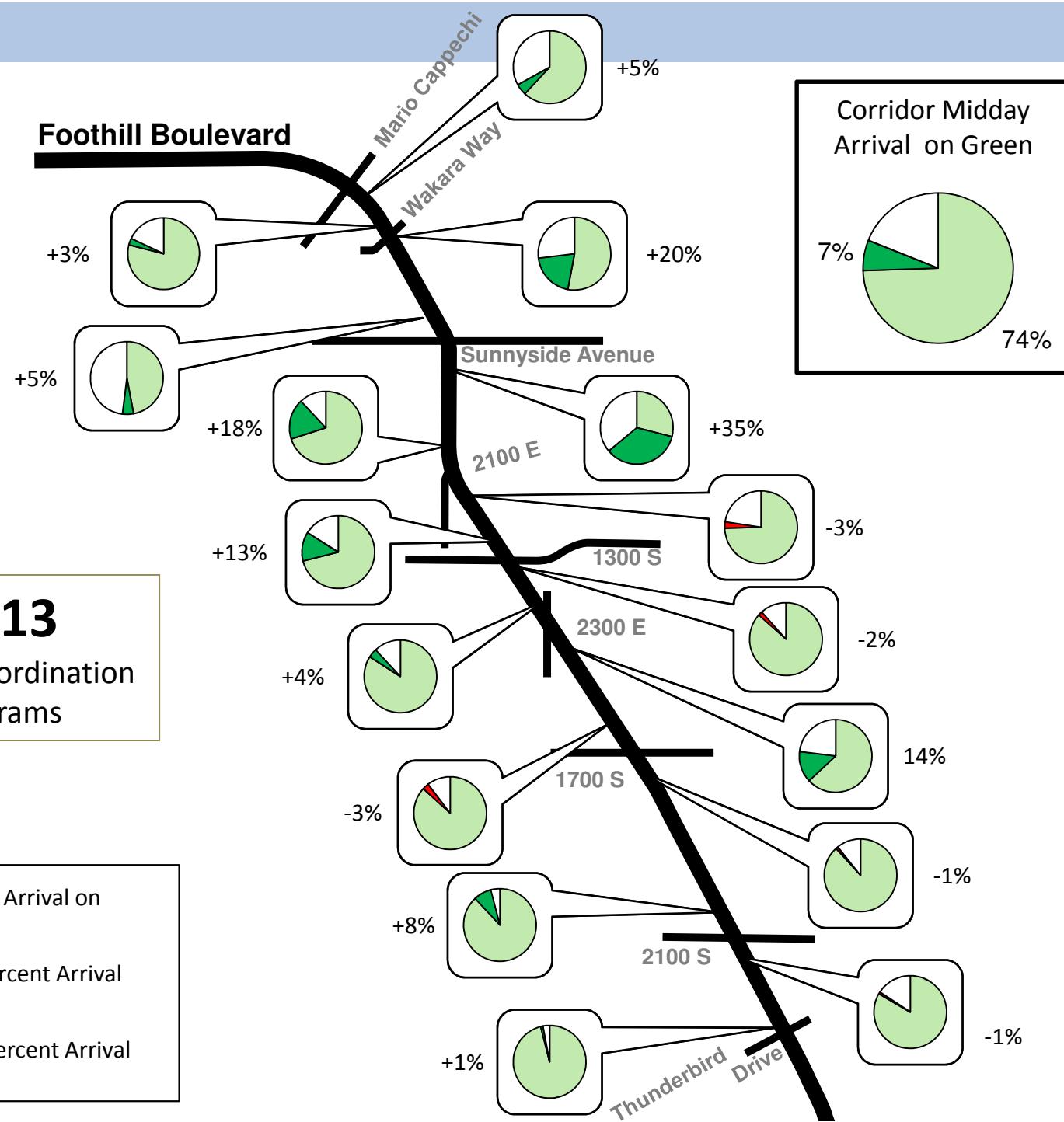
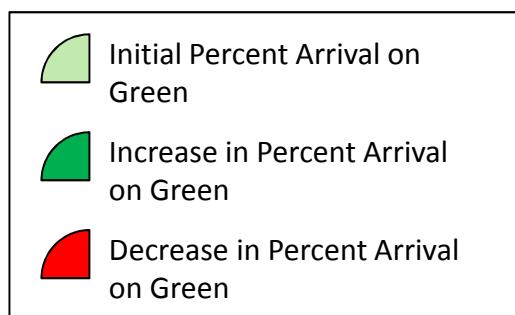
Approach Link Comparison

Link	Approaches		Upstream AOG			Downstream AOG			Total Link AOG			Delta	AOG Chart
	Upstream	Downstream	Existing	Predicted	Change	Existing	Predicted	Change	Existing	Predicted	Change		
2	7223 Southbound	7222 Northbound	5431	5632		5938	5824		11369	11456		6	 PCD Options
	Foothill Drive 2100 South	Foothill Drive 1700 South	85%	88%		90%	88%		88%	88%			
5	7220 Southbound	7503 Northbound	2281	4059		4976	5149		7257	9208		38	 PCD Options
	Foothill Drive 1300 South	Foothill Drive 2100 East	42%	76%		88%	92%		66%	84%			
Corridor Summary			39585	44992		32610	36968		72195	81960			
			72 %	82 %		68 %	77 %		70 %	80 %			

Red indicates predicted negative change in AOG

Green indicates predicted positive change in AOG

2013
Purdue Coordination
Diagrams





ATSPM ALERTS

UDOT Automated Traffic Signal Performance Measures

Jamie Mackey, P.E, PTOE
UDOT Statewide Signal Engineer

System Health Alerts

1 **No SPM data:** identifies signals with less than 500 records in the database between midnight and midnight the previous day

2 **Too many max outs:** identifies phases with more than 90% max outs in at least 50 activations between 1 a.m. and 5 a.m.

3 **Too many force offs:** identifies phases with more than 90% force offs in at least 50 activations between 1 a.m. and 5 a.m.

4 **Too many ped calls:** identifies phases with more than 200 pedestrian activations between 1 a.m. and 5 a.m.

5 **Low PCD detector count:** identifies phases with PCD detectors that have less than 100 vehicles counted between 5 p.m. and 6 p.m. the previous day.

SPM Alerts for 5/22/2016

 SPMWatchdog@utah.gov

to marktaylor, me, signaldesk, shanejohnson, bryan.meenen, kbarnes, SWinters, tforbush, jay

–The following signals had too few records in the database:
 4671 - 13400 South & 4500 West - Phase: 0 (Missing Records)
 5701 - 500 South & 400 East (Btfl) - Phase: 0 (Missing Records)

–The following signals had too many force off occurrences:
 1224 - North Temple & Main Street - Phase: 3 (Force Offs 97.6%)
 7252 - 500 South & Main Street - Phase: 2 (Force Offs 100%)
 7252 - 500 South & Main Street - Phase: 6 (Force Offs 100%)

–The following signals had too many max out occurrences:
 1123 - Wolcott St & 100 South - Phase: 2 (Max Outs 100%)
 1124 - Sunnyside (850 S) & Guardsman Way - Phase: 2 (Max Outs 100%)
 1124 - Sunnyside (850 S) & Guardsman Way - Phase: 6 (Max Outs 100%)
 4024 - 7000 South (Fort Union) & 1300 East - Phase: 7 (Max Outs 92.6%)
 4029 - 7200 South & 700 East - Phase: 1 (Max Outs 100%)
 4103 - 4680 South (Murray-Holladay) & 2320 East (Holladay) - Phase: 5 (Max Outs 100%)
 4118 - 6200 South & 3655 West (Dixie) - Phase: 2 (Max Outs 100%)
 4511 - 4100 South & 3200 West - Phase: 4 (Max Outs 100%)
 4820 - 4835 South & 2700 West - Phase: 2 (Max Outs 100%)
 5063 - Lincoln & 24th - Phase: 4 (Max Outs 100%)
 5063 - Lincoln & 24th - Phase: 8 (Max Outs 100%)
 5080 - Washington & Adams - Phase: 5 (Max Outs 100%)
 5170 - 200 N (Kaysville) & Main St. - Phase: 4 (Max Outs 100%)
 5305 - Main St. & 200 North (Logan) - Phase: 7 (Max Outs 96.2%)
 5900 - 900 W. (Kays Dr.) & 200 North, (Kaysville) - Phase: 4 (Max Outs 90.4%)
 6035 - Pioneer Crossing & Millpond Drive - Phase: 8 (Max Outs 91.9%)
 6608 - 100 West & 100 North - Phase: 8 (Max Outs 98.5%)
 7107 - Redwood Road & 4700 South - Phase: 5 (Max Outs 93.2%)

–The following signals had unusually low detector hits:
 5134 - SR-193 (700 S) & I-15 NB (Clearfield) - Phase: 2 (Has Unusually Low Counts.)
 7061 - Bangerter Hwy (SR-154) & 4100 South - Phase: 1 (Has Unusually Low Counts.)
 7061 - Bangerter Hwy (SR-154) & 4100 South - Phase: 7 (Has Unusually Low Counts.)
 7361 - Bangerter Hwy (SR-154) & 13400 South - Phase: 1 (Has Unusually Low Counts.)

–The following signals have stuck ped detectors:
 1023 - South Temple & 200 West - Phase: 2 (Stuck Ped)
 1023 - South Temple & 200 West - Phase: 4 (Stuck Ped)
 1023 - South Temple & 200 West - Phase: 6 (Stuck Ped)
 1023 - South Temple & 200 West - Phase: 8 (Stuck Ped)
 4511 - 4100 South & 3200 West - Phase: 4 (Stuck Ped)
 6009 - Main (Lehi) & I-15 SPUI - Phase: 6 (Stuck Ped)
 7826 - 9800 S (Little Cottonwood Rd) & Wasatch Blvd (3500 E) - Phase: 4 (Stuck Ped)

Alert Evaluation

1

No ATSPM data

Check communication to signal

Check controller clock

Check IP address in SPM configuration

Check VIOT = NO & DB State = All Saved (Econolite MM 9-3-1 SpFn*3)

Try enabling Upload Current

Create a WO to cold start the controller

2

Too many max outs

Check for recalls

Check for constant call on a detector channel

Consider whether a bandaid is necessary

3

Too many force offs

Should the signal be in coordination?

Is a non-coordinated phase maxing out?

Skip only 2-6 pairs and dummy phases

4

Too many ped calls

Check for recalls

Check for constant call on a detector channel

5

Low PCD detector count

Note: Evaluate the VOLUME on the PCD charts, not the phase data

Is count channel configured correctly in SPM Config Tool?

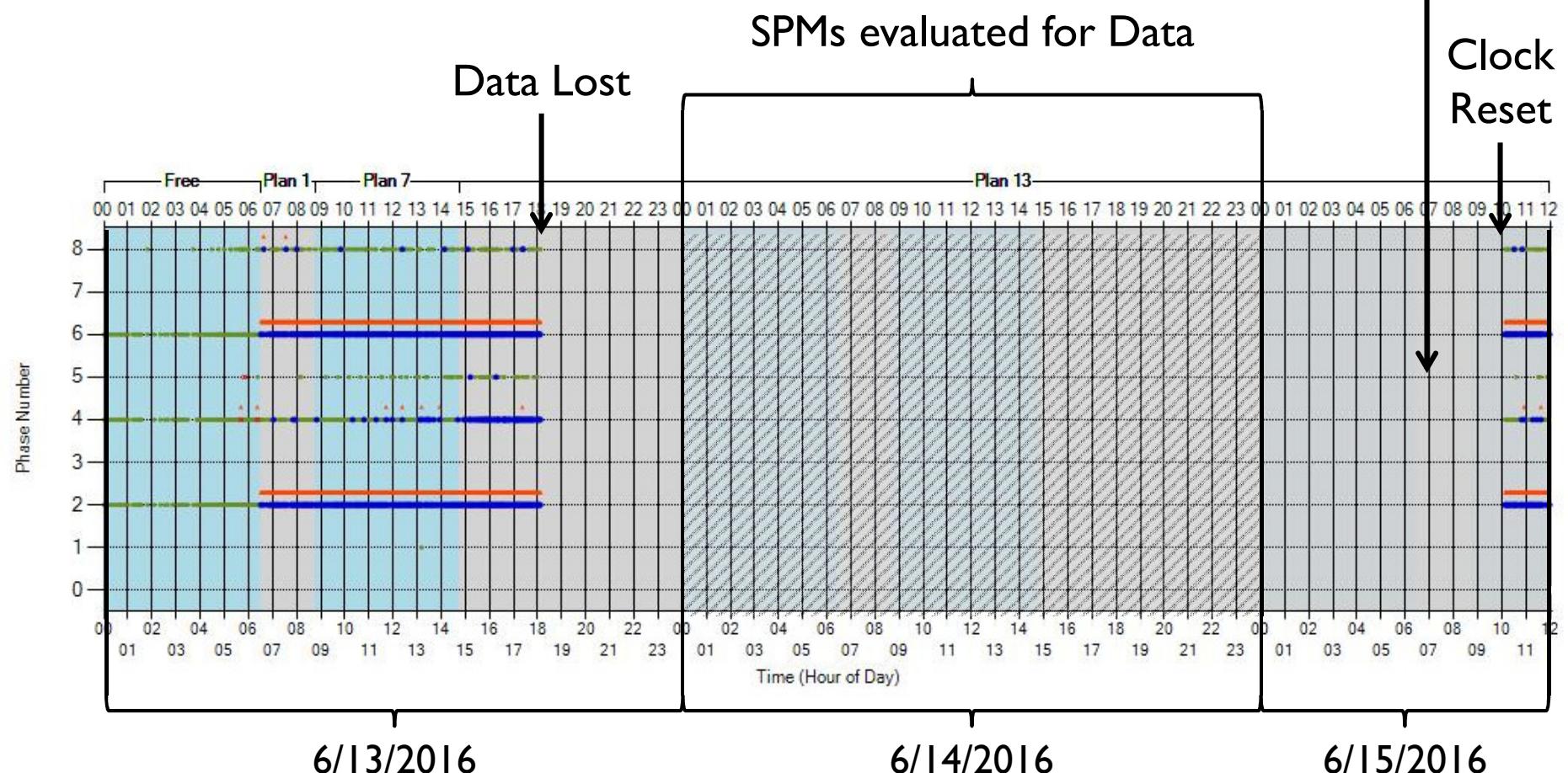
Is ECPI Log enabled for count channel?

Is the detector working?

Is the detector communicating to the controller?

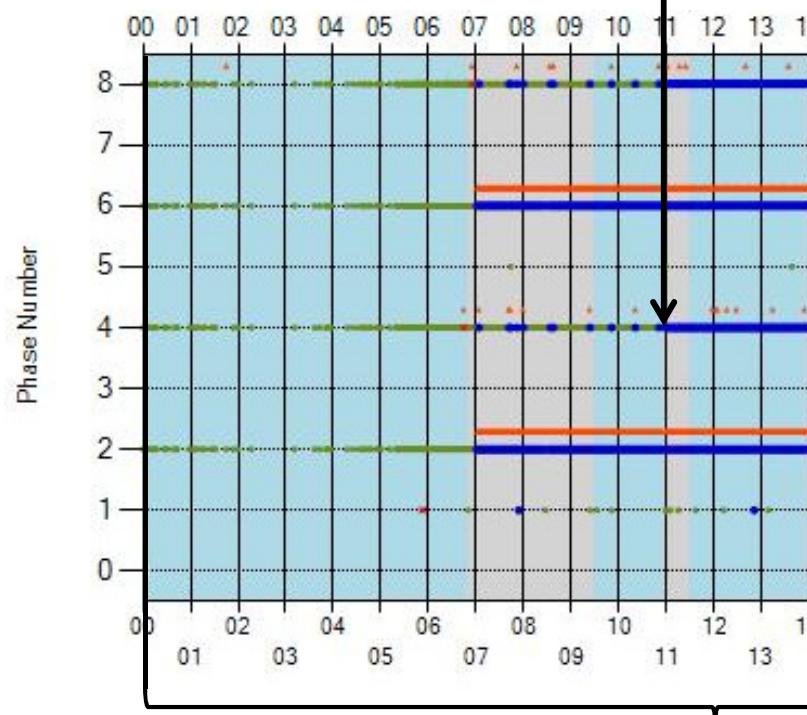
Try resetting the sensor and VERIFY with Upload Current

1 No SPM Data



2 Too many max outs

Phase 4 starts
constant call



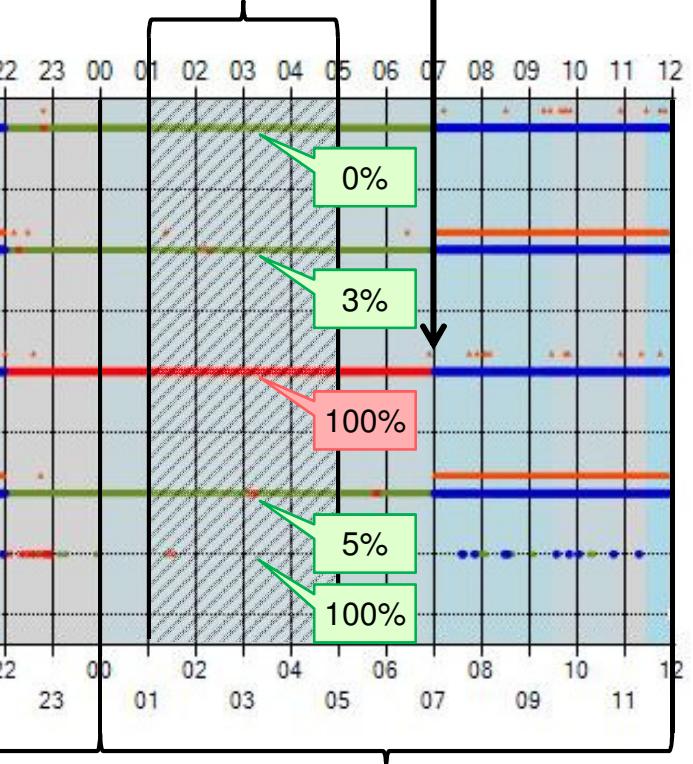
4/8/2014

- Gap out
- Max out
- Force off

- Pedestrian activation (shown above phase line)
- Skip

Alert email
sent

SPMs evaluated
for % max outs



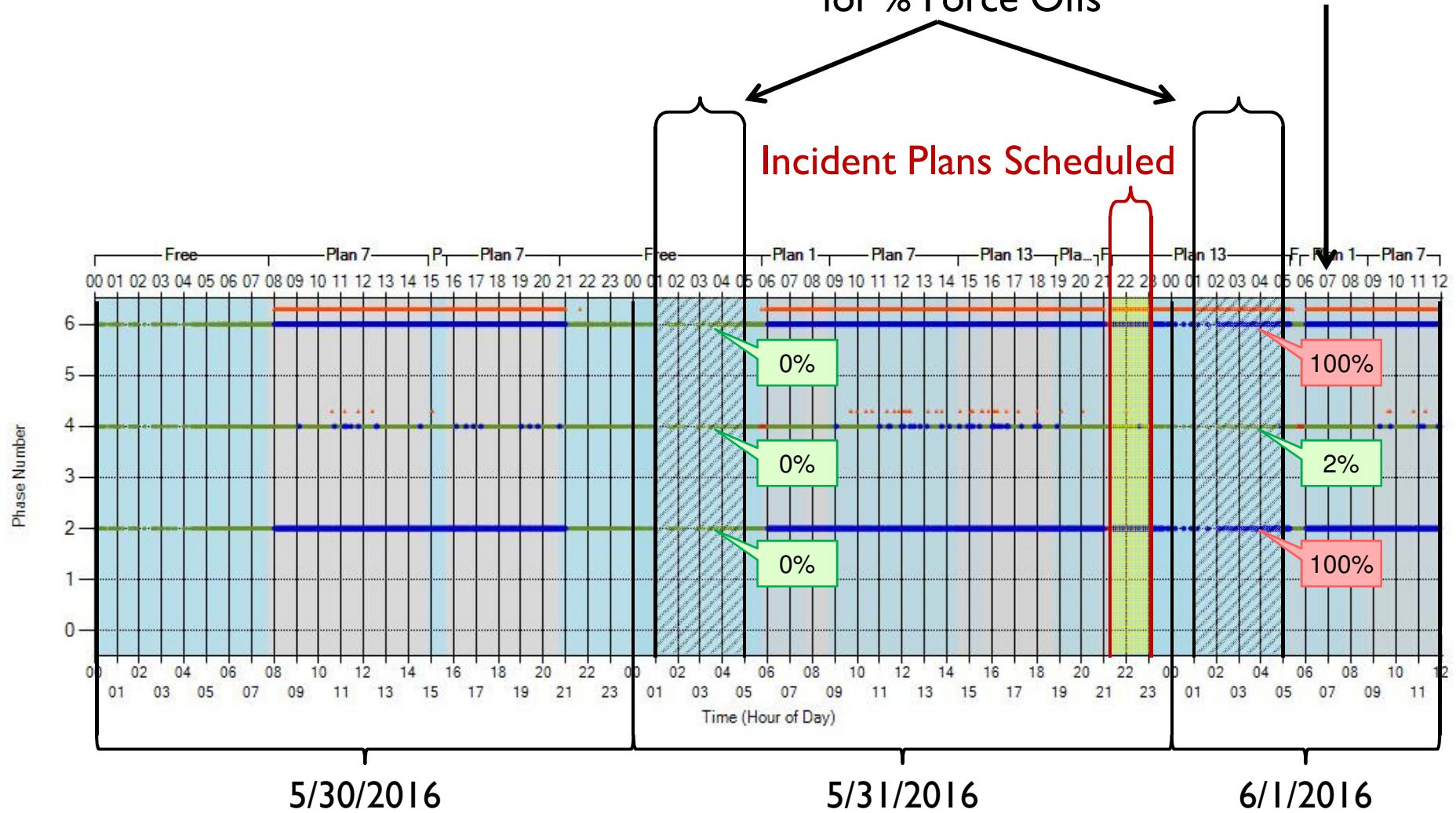
4/9/2014

Metric: Purdue Phase Termination
Detection Requirements: None

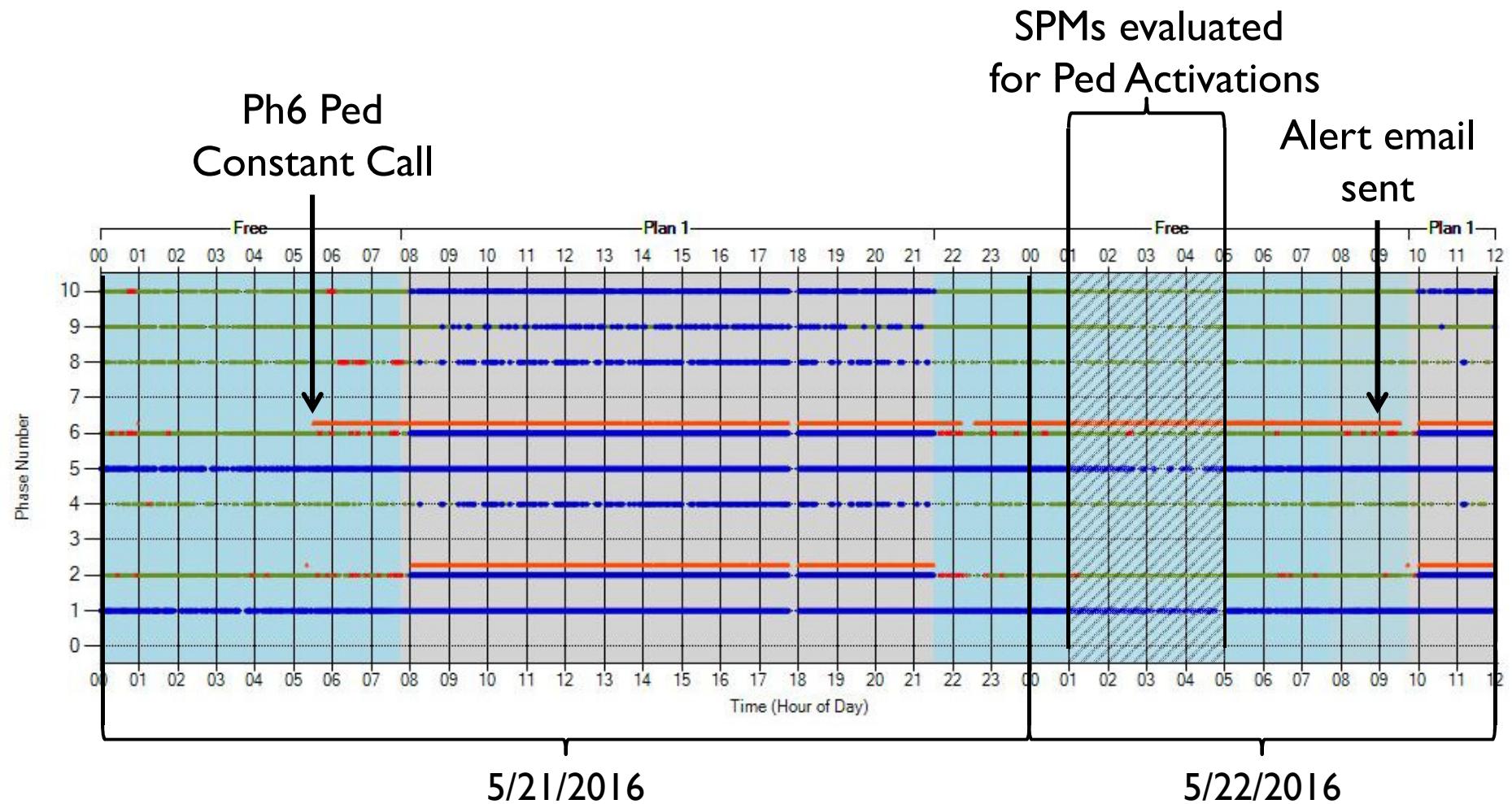
3 Too many force offs

Phases evaluated
for % Force Offs

Alert email
sent



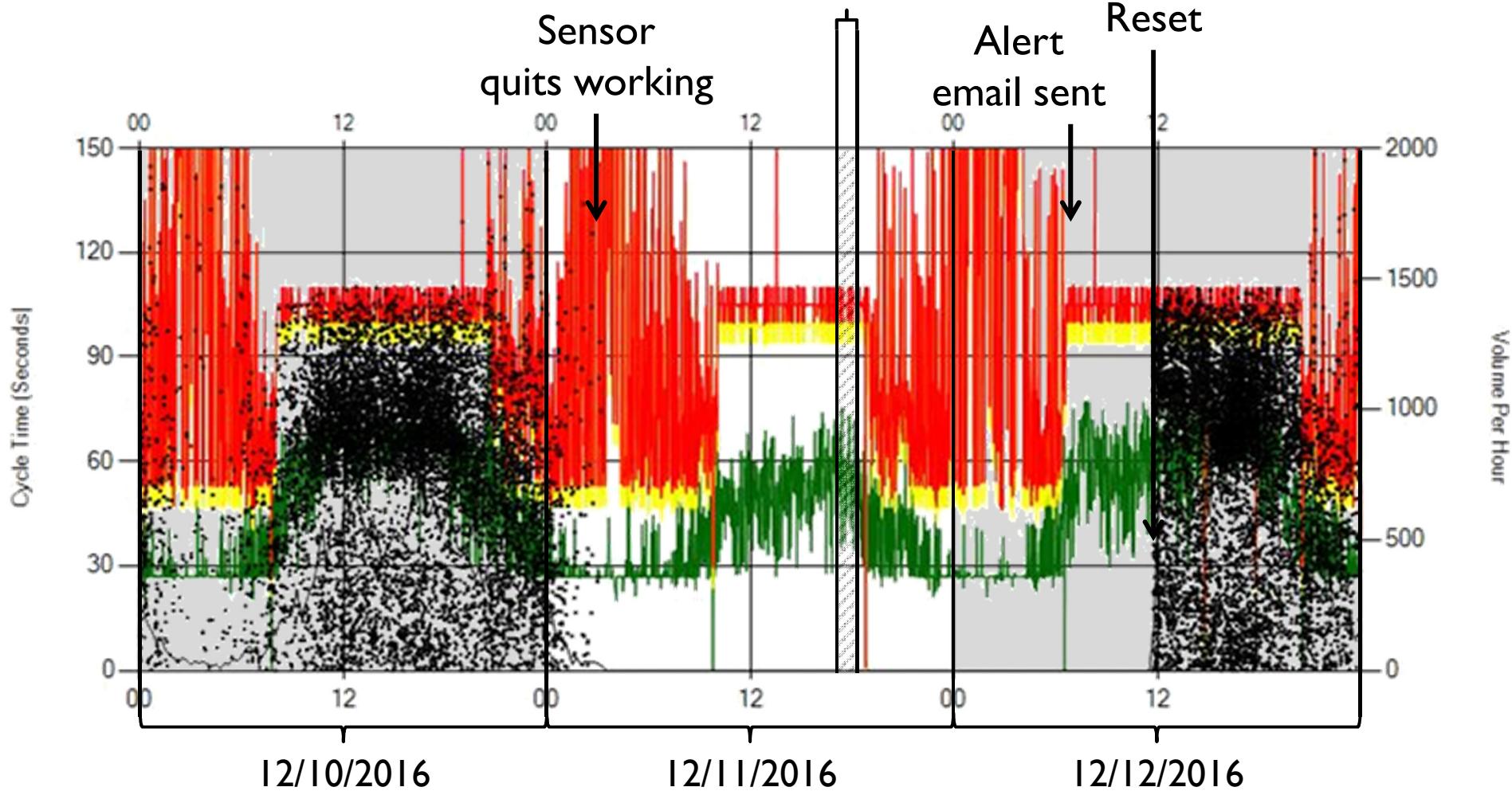
4 Too many ped calls



5

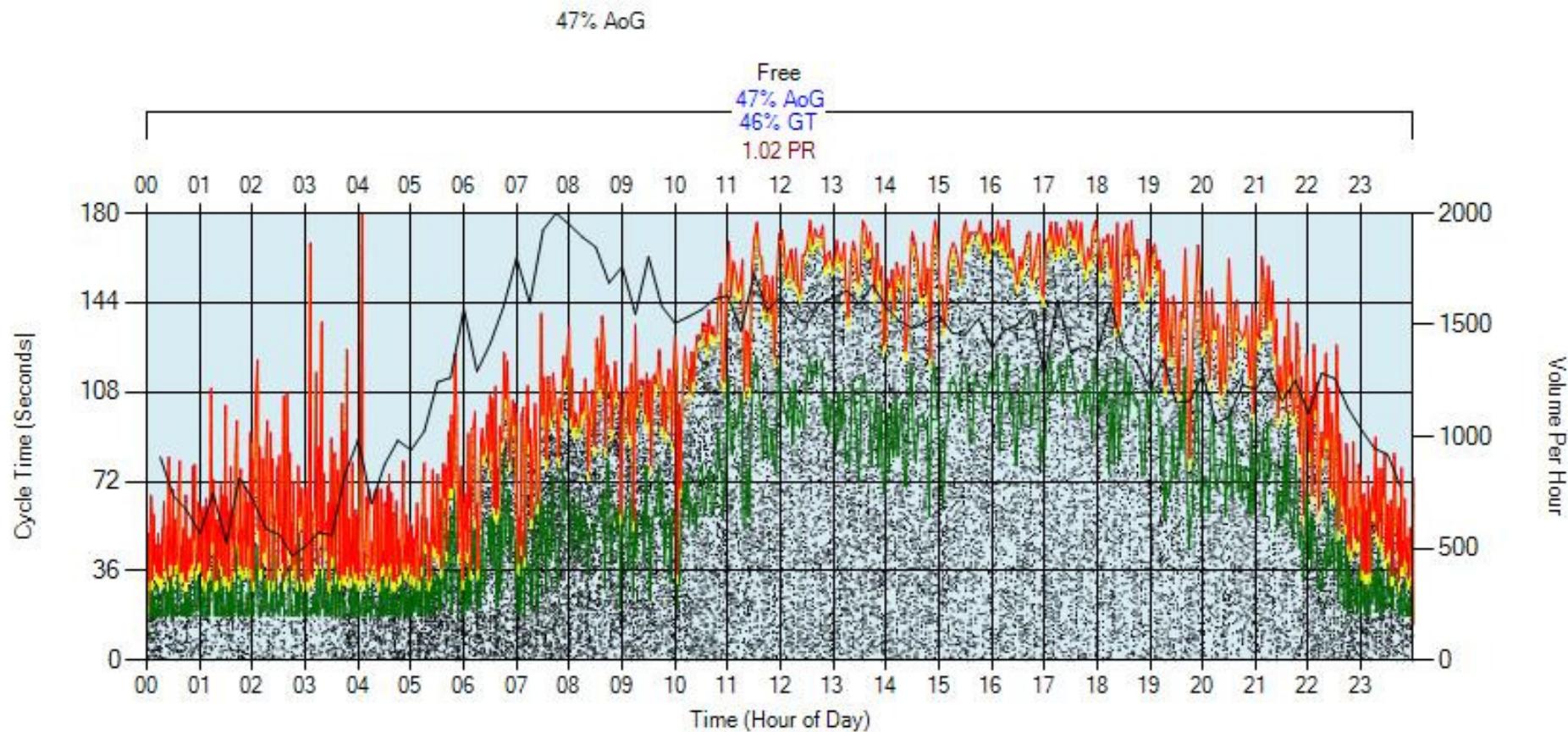
Low PCD detector count

SPMs evaluated for
PCD Detector Volume



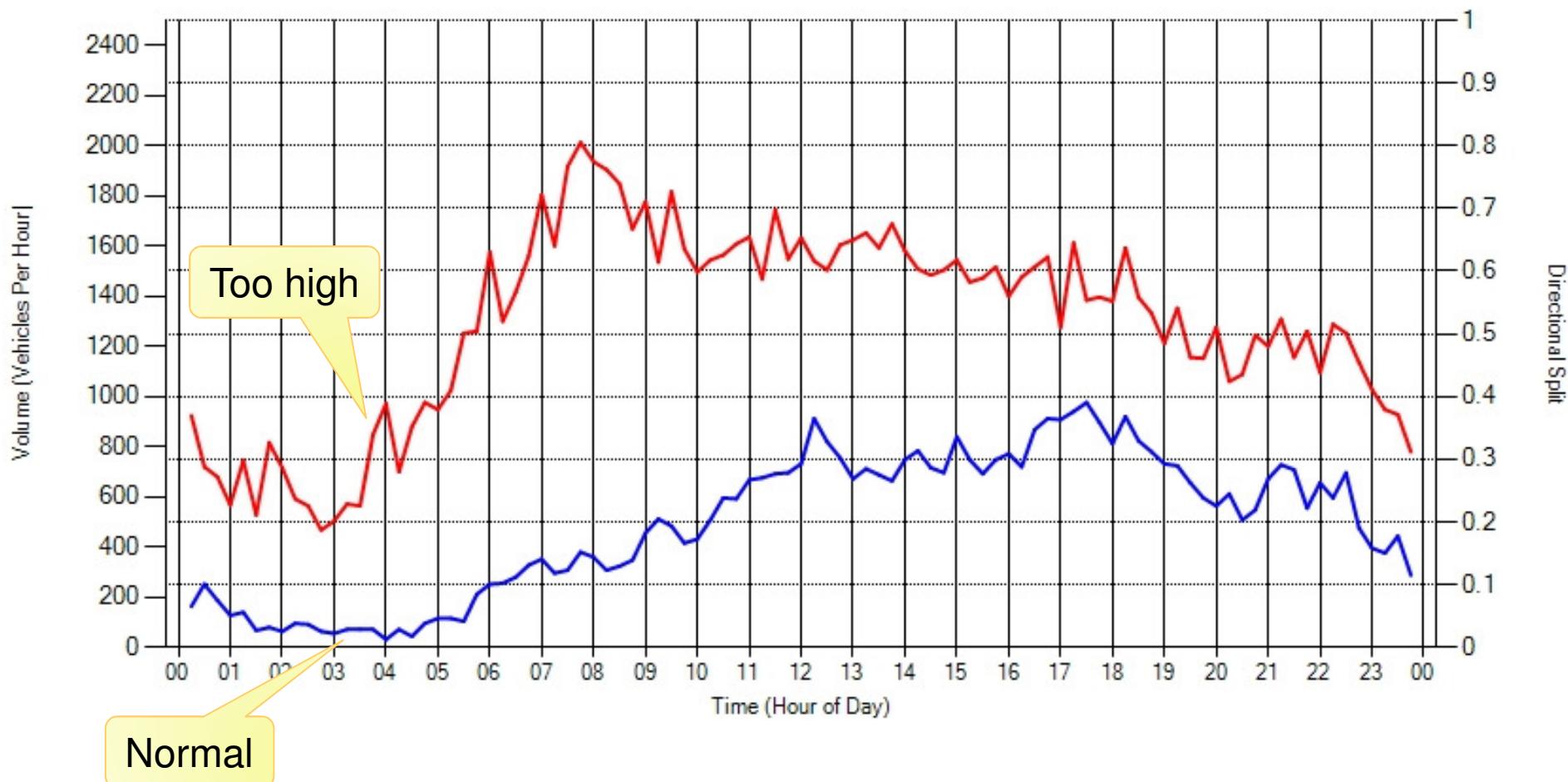
6 High PCD detector count

Washington 12th Signal 5030 Phase: 6 Southbound
Thursday, August 04, 2016 12:00 AM - Thursday, August 04, 2016 11:59 PM



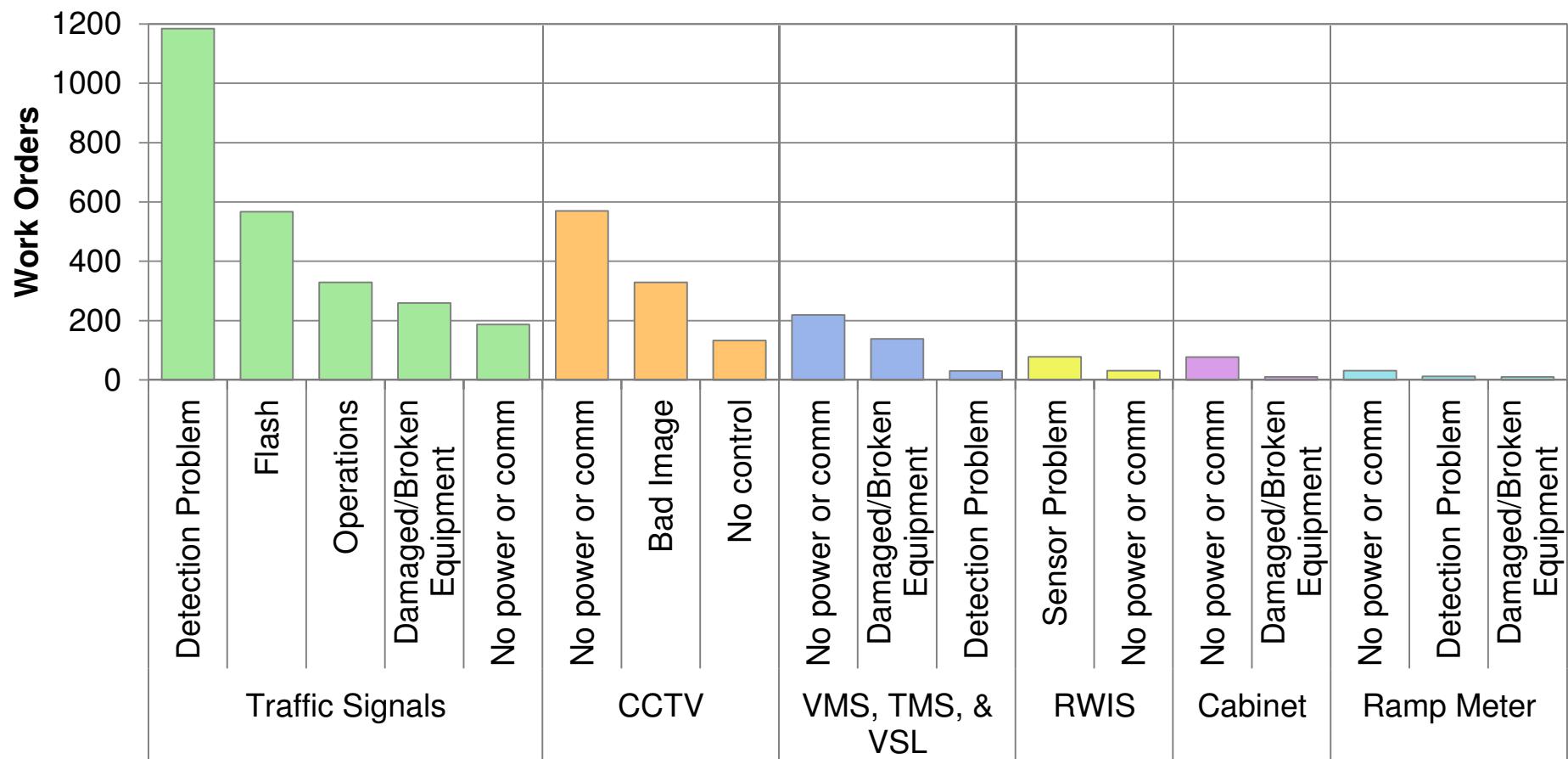
6 High PCD detector count

Volume report for Washington 12th on the Northbound and Southbound approaches.
8/4/2016 12:00:00 AM - 8/4/2016 11:59:00 PM - Using Advanced Detection



Work Orders

Work Orders for ATMS Equipment
July 2015 to July 2016





LOG ACTION TAKEN

UDOT Automated Traffic Signal Performance Measures

Jamie Mackey, P.E, PTOE
UDOT Statewide Signal Engineer

Log Action

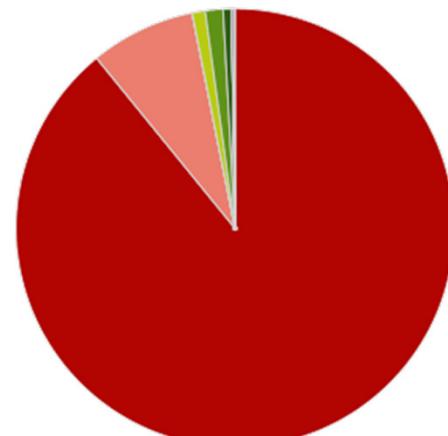
Name	Jamie Mackey	
Date	1/17/2017 11:07:05 AM	
Signal	7220 - Foothill Drive 1300 South ▾	
Agency	State Government ▾	
Actions	<input type="checkbox"/> Actuated Coord. <input type="checkbox"/> All-Red Interval <input type="checkbox"/> Coord On/Off <input type="checkbox"/> Modeling <input type="checkbox"/> Cycle Length <input type="checkbox"/> Traffic Study <input checked="" type="checkbox"/> Detector Issue <input type="checkbox"/> Yellow Interval <input type="checkbox"/> Offset <input type="checkbox"/> Force Off Type <input type="checkbox"/> Sequence <input checked="" type="checkbox"/> Split Adjustment <input type="checkbox"/> Time Of Day <input type="checkbox"/> Manual Command <input type="checkbox"/> Other	
MetricTypes	<input type="checkbox"/> Purdue Phase Termination <input type="checkbox"/> Approach Volume <input checked="" type="checkbox"/> Split Monitor <input type="checkbox"/> Approach Delay <input checked="" type="checkbox"/> Pedestrian Delay <input type="checkbox"/> Arrivals On Red <input type="checkbox"/> Preemption Details <input type="checkbox"/> Approach Speed <input type="checkbox"/> Turning Movement Counts <input type="checkbox"/> Yellow and Red Actuations <input type="checkbox"/> Purdue Coordination Diagram <input type="checkbox"/> Purdue Split Failure	
Comment	Identified broken detector and adjuste	
<input type="button" value="Create"/>		

Select multiple

Review Action and Metric Use

Chart Usage

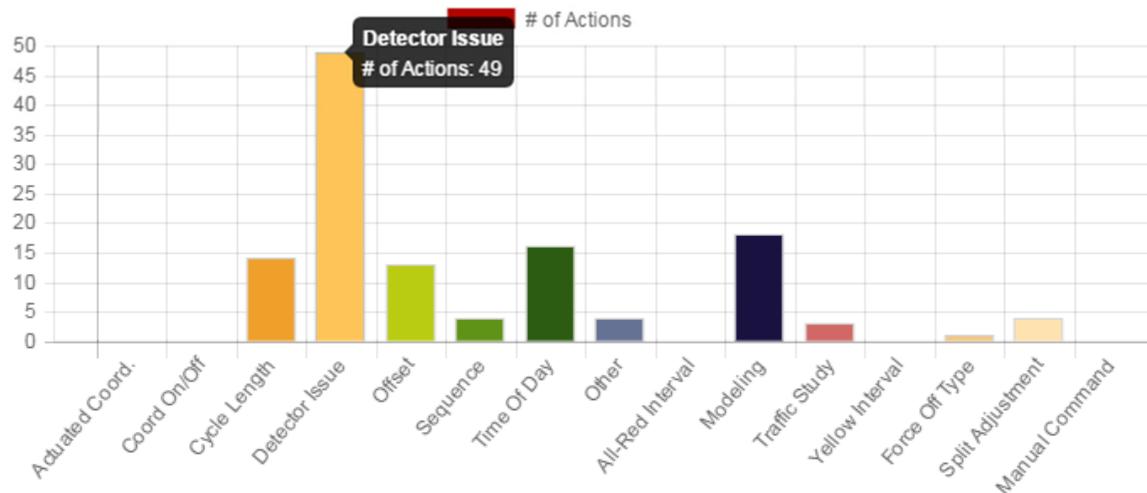
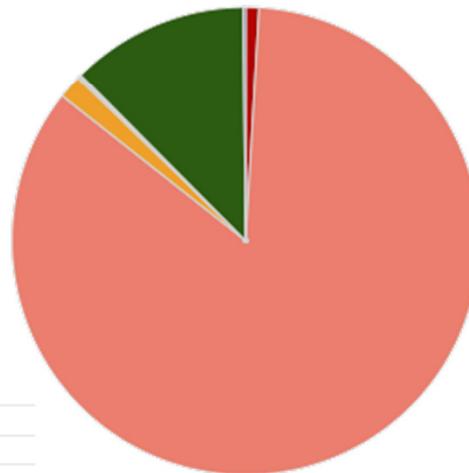
- █ Purdue Phase Termination
- █ Split Monitor
- █ Pedestrian Delay
- █ Preemption Details
- █ Turning Movement Counts
- █ Purdue Coordination Diagram
- █ Approach Volume
- █ Approach Delay
- █ Arrivals On Red
- █ Approach Speed
- █ Yellow and Red Actuations
- █ Purdue Split Failure



Split Monitor

Agency Usage

- █ Academics
- █ City Government
- █ Consultant
- █ County Government
- █ Federal Government
- █ MPO
- █ State Government
- █ Other



Review Metric Use

