UDOT Signal Performance Metrics: New and Upcoming Metrics

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Split Monitor

Foothill Drive Sunnyside SIG#7219 Phase 5
Tuesday, September 01, 2015 12:00 AM - Tuesday, September 01, 2015 11:59 PM

11.5 - 85 Percentile Split
10.8 Avg. Split
0.0% MaxOuts
11.9% GapOuts
88.1% Skips

Free
Plan 1
Plan 10
Plan 13
Plan 10
Free

25.8 - 85 Percentile Split
18.9 - 85 Percentile Split
25.0 - 85 Percentile Split
18.9 - 85 Percentile Split
13.3...

19.2 Avg. Split
18.5 Avg. Split
21.6 Avg. Split
18.5 Avg. Split
11.3...

0.0% ForceOffs
89.9% ForceOffs
38.8% ForceOffs
87.4% ForceOffs
0.0%...

96.4% Ga...
4.1% GapOuts
58.2% GapOuts
5.4% GapOuts
33.7...

3.6% Ski...
6.1% Skips
2.0% Skips
7.2% Skips
66.3...

Phase Duration [Seconds]

Time (Hour of Day)
Purdue Split Failure

Purdue Split Failure
SIG#7219 – Foothill & Sunnyside
Phase 5
11:00 a.m. to 1:00 p.m.

Split Fail Rate: 16% (9/57 cycles)
Max Consecutive Failures: 3
Purdue Split Failure – 24-hr format
Purdue Split Failure – 24-hr format
Purdue Split Failure – 24-hr format
Purdue Split Failure – 24-hr format
Detection for Purdue Split Failure
New Metrics

Metric Type

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

**Event Codes**

- 45 – Ped Call on
- 21 – Ped Walk on

![Diagram of Pedestrian Delay]

**Vehicle Phase**

- Ped Call Registered
- Ped WALK Start

**Pedestrian Phase**

- Ped Delay
Pedestrian Delay

**Event Codes**
- 45 – Ped Call on
- 21 – Ped Walk on

**Phase 2**
Coordinated phase

**Phase 4**
Side street
State St & Orem Center St - SIG#6311
12/9/2015 0:00 to 12/9/2015 23:59

Pattern Change

EVENT CODES
150, Param 1 – In Step
150, Param 2 – Transition Add
150, Param 3 – Transition Subtract
150, Param 4 – Transition Dwell
Transition

State St & Orem Center St - SIG#6311
12/9/2015 0:00 to 12/9/2015 23:59

<table>
<thead>
<tr>
<th>Number Transitions</th>
<th>Total Duration</th>
<th>Average Duration</th>
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<tbody>
<tr>
<td>Type 2 - Add</td>
<td>1</td>
<td>01:04</td>
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<tr>
<td>Type 3 - Subtract</td>
<td>107</td>
<td>14:15</td>
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<tr>
<td>Type 4 - Dwell</td>
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<td>00:00</td>
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</table>

EVENT CODES
- 150, Param 1 – In Step
- 150, Param 2 – Transition Add
- 150, Param 3 – Transition Subtract
- 150, Param 4 – Transition Dwell
Preemption Requests & Services

EVENT CODES
102 – Preempt Call On
105 – Preempt Entry Started
Preemption Details (Rail)

Preemptor #1 Event Details
Geneva Pkwy & 400 S - SIG#6312
12/9/2015 0:00 to 12/9/2015 23:59

EVENT CODES
102 – Preempt Call On
103 – Gate Down
104 – Preempt Call Off
105 – Preempt Entry Started
106 – Begin Track Clearance
111 – Begin Exit Interval
150, Param 1 – In Step

Preemption Call Active

- In Step
- End Dwell
- Time to Service
- Entry Delay
- Call End
- Call Max Out
- Track Clear
- Gate Down
Preemption Details (Rail)

Preemptor #1 Event Details
Geneva Pkwy & 400 S - SIG#6312

<table>
<thead>
<tr>
<th>Number of Preempt Requests</th>
<th>63</th>
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<tbody>
<tr>
<td>Preempt 1</td>
<td>63</td>
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<table>
<thead>
<tr>
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<tr>
<td>Preempt 1</td>
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<table>
<thead>
<tr>
<th>Number of Preempt Max Outs</th>
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<tr>
<td>Preempt 1</td>
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**Dwell Time**

<table>
<thead>
<tr>
<th>Preempt 1</th>
<th>Minimum</th>
<th>1:13</th>
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<tbody>
<tr>
<td></td>
<td>Maximum</td>
<td>7:03</td>
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<tr>
<td></td>
<td>Average</td>
<td>1:50</td>
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<tr>
<td></td>
<td>Total</td>
<td>1:56:06</td>
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**Request Duration**

<table>
<thead>
<tr>
<th>Preempt 1</th>
<th>Minimum</th>
<th>1:12</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Maximum</td>
<td>7:03</td>
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<td>Average</td>
<td>1:42</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1:47:17</td>
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</table>

EVENT CODES
- 102 – Preempt Call On
- 103 – Gate Down
- 104 – Preempt Call Off
- 105 – Preempt Entry Started
- 106 – Begin Track Clearance
- 111 – Begin Exit Interval
- 150, Param 1 – In Step
Preemption Requests & Services

EVENT CODES
102 – Preempt Call On
105 – Preempt Entry Started
Preemption Details (EMV)

Preemptor #3 Event Details
Geneva Pkwy & 400 S - SIG#6312
12/9/2015 0:00 to 12/9/2015 23:59

Preemptor #4 Event Details
Geneva Pkwy & 400 S - SIG#6312
12/9/2015 0:00 to 12/9/2015 23:59

Preemptor #5 Details
Geneva Pkwy & 400 S
12/9/2015 0:00 to 23:59

EVENT CODES
102 – Preempt Call On
104 – Preempt Call Off
105 – Preempt Entry Started
107 – Begin Dwell
110 - Preempt Max Out
111 – Begin Exit Interval
Transit Signal Priority Requests & Services

Priority Request
3500 S & 3450 W - SIG#7284
12/9/2015 0:00 to 12/9/2015 23:59

EVENT CODES
112 – TSP Check In
113 – Early Green
114 – Extend Green
Transit Signal Priority – Request Duration

Transit Signal Priority Request Duration
3500 S & 3450 W - SIG#7284
12/9/2015 0:00 to 12/9/2015 23:59

EVENT CODES
112 – TSP Check In
115 – TSP Check Out

Priority Request Duration (minutes)

Time of Day

TSP #1  TSP #2
Transit Signal Priority – Request Duration

### Transit Signal Priority Request Duration

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>00:00</th>
<th>00:30</th>
<th>01:00</th>
<th>01:30</th>
<th>02:00</th>
<th>02:30</th>
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<tbody>
<tr>
<td><strong>TSP #1</strong></td>
<td></td>
<td></td>
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<tr>
<td>Priority 1</td>
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<tr>
<td>Early Green</td>
<td></td>
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<tr>
<td>Extend Green</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TSP #2</strong></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Priority 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early Green</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extend Green</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Number of Priority Requests

| TSP 1 | 62 |
| TSP 2 | 64 |

### Number of Priority Services

<table>
<thead>
<tr>
<th>TSP 1</th>
<th>Priority 1</th>
<th>106</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Early Green</td>
<td>84</td>
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<tr>
<td></td>
<td>Extend Green</td>
<td>22</td>
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### Priority Request Duration

<table>
<thead>
<tr>
<th>TSP 1</th>
<th>Minimum</th>
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<tbody>
<tr>
<td></td>
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<td>01:59</td>
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<td></td>
<td>Average</td>
<td>00:45</td>
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<table>
<thead>
<tr>
<th>TSP 2</th>
<th>Minimum</th>
<th>00:00</th>
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<tbody>
<tr>
<td></td>
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<td>01:59</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>00:23</td>
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</tbody>
</table>

### Event Codes

- 112 – TSP Check In
- 115 – TSP Check Out

---

**Number of Priority Requests**

**Number of Priority Services**

**Priority Request Duration**

---

**Time of Day**

**TSP #1**

**TSP #2**
Transit Signal Priority – Request Duration

EVENT CODES
112 – TSP Check In
115 – TSP Check Out

Number of Priority Requests
TSP #1: 62
TSP #2: 64

Number of Priority Services
Priority 1: 106
Early Green: 84
Extend Green: 22

Priority Request Duration
TSP 1:
Minimum: 00:06
Maximum: 01:59
Average: 00:45

TSP 2:
Minimum: 00:00
Maximum: 01:59
Average: 00:23

Time of Day
6 7 8 9 10 11 12

Priority Service
3500 S & 3450 W - SIG#7284
12/9/2015 0:00 to 12/9/2015 23:59

Priority Number
00:00 01:00 02:00

TSP Plan Number
0 1 2 3 4 5 6 7 8 9 10

TSP #1
TSP #2
Early Green
Green Extend

Legend:
Case Study: Impact of Fully Actuated Coordination on Arrivals on Green

US-89 & 200 N – SIG#5382
11/11/2015

US-89 & 200 N – SIG#5382
1/13/2016
## Arrivals on Green

<table>
<thead>
<tr>
<th></th>
<th>AM</th>
<th>MD</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Before</strong></td>
<td>82 / 93</td>
<td>88 / 91</td>
<td>93 / 94</td>
</tr>
<tr>
<td>Split Ext = 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>After</strong></td>
<td>82 / 90</td>
<td>87 / 91</td>
<td>92 / 93</td>
</tr>
<tr>
<td>Split Ext = 25/20/25</td>
<td></td>
<td></td>
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</tbody>
</table>