

# December 2016

## Monthly Operations Report



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## ATTACHMENTS

Broadspectrum Operations and Maintenance Monthly Report

# INTRODUCTION

Pursuant to Schedule 6, Section 1.8.2(a) of the Concession Agreement, Plenary Roads Denver (“PRD”) is required to submit a monthly report covering all essential statistics related to the Managed Lanes. The following data covers the month of December 2016. Operationally, December was a positive month. Several routine maintenance tasks were completed, there were minimal incidents to maintained elements, and traffic volumes were consistent with expectations.

## 1.0 VOLUMES AND LANE USAGE

In July 2015, the Managed Lanes for Phase 1 on US36 began toll operations. At the same time, HOV vehicles were required to use a switchable transponder in order to travel the I-25 and US36 Managed Lanes at no charge. The traffic patterns immediately shifted towards more ExpressToll™ (AVI) and License Plate (LPT) vehicles and fewer HOV transactions. Over the last several months as more commuters use the transponders for either AVI or HOV travel, LPT transactions have consistently decreased as a percentage of total traffic volume. The total monthly gantry traffic volume for December 2016 in the I-25 Central and US 36 Managed Lanes was 250,311 and 1,032,399, respectively.

The table below provides the monthly summary for each Managed Lanes roadway, along with a detailed breakdown of weekday volumes. For reference, the AM Peak Period is considered to be weekdays from 6:45 am – 8:45 am. The PM Peak Period is considered to be weekdays from 4:30pm – 6:00pm. It should be noted that the I-25 Managed Lane traffic reflects traffic counts from a single gantry and US 36 Managed Lane counts reflect fourteen gantries, seven gantries in each direction. Therefore, US 36 data will indicate far greater traffic counts that are not comparative to those of I-25.

The following charts depict the distribution of traffic by type (Figure 1) and the daily traffic counts (Figure 2) and for the month.

Traffic Summary (I-25C)						
	AVI	LPT	HOV	Non-Rev & Hybrid	Total	Hybrid
Total Monthly Traffic	90,442	93,045	55,344	11,480	250,311	1,746
Maximum Weekday Traffic	5,674	6,214	2,882	640	13,365	107
Average Weekday Traffic	4,030	3,606	2,234	512	9,870	78
Average Hourly AM Peak Traffic	612	351	339	82	1,302	N/A
Average Hourly PM Peak Traffic	529	421	293	71	1,243	N/A

Traffic Summary (US 36)						
	AVI	LPT	HOV	Non-Rev & Hybrid	Total	Hybrid
Total Monthly Traffic	461,937	233,393	297,805	39,264	1,032,399	6,692
Maximum Weekday Traffic	29,004	17,494	13,775	2,069	59,839	437
Average Weekday Traffic	20,297	9,582	10,412	1,747	42,038	285
Average Hourly AM Peak Traffic	2,571	949	882	222	4,624	N/A
Average Hourly PM Peak Traffic	3,257	1,419	1,376	238	6,290	N/A

Table 1 – Monthly Traffic Summaries

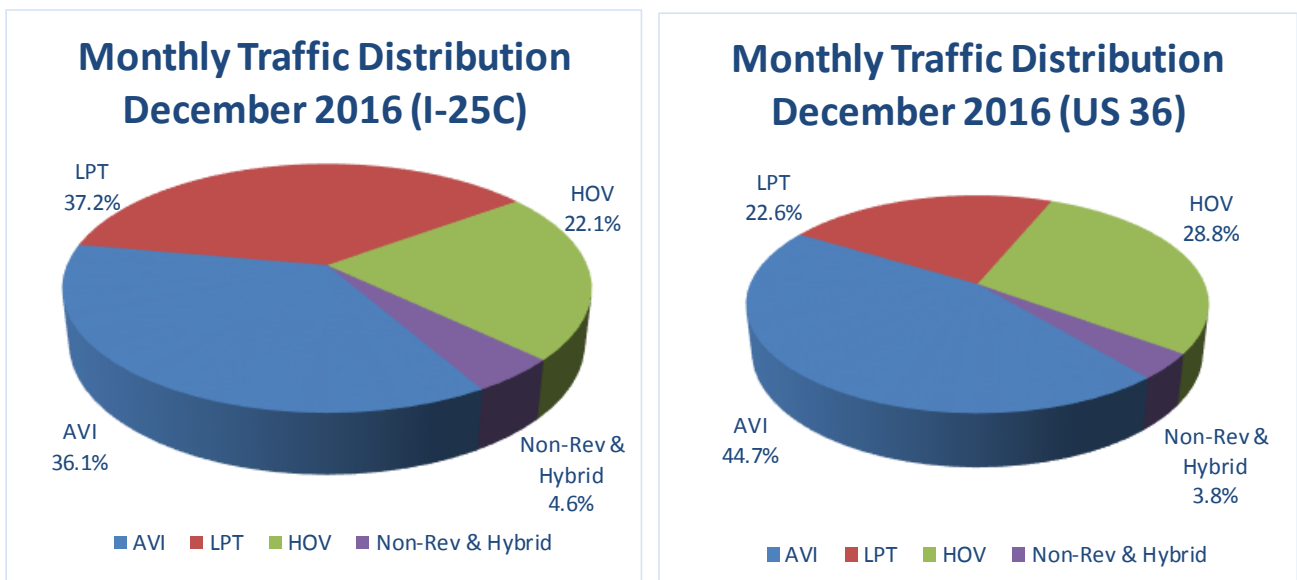
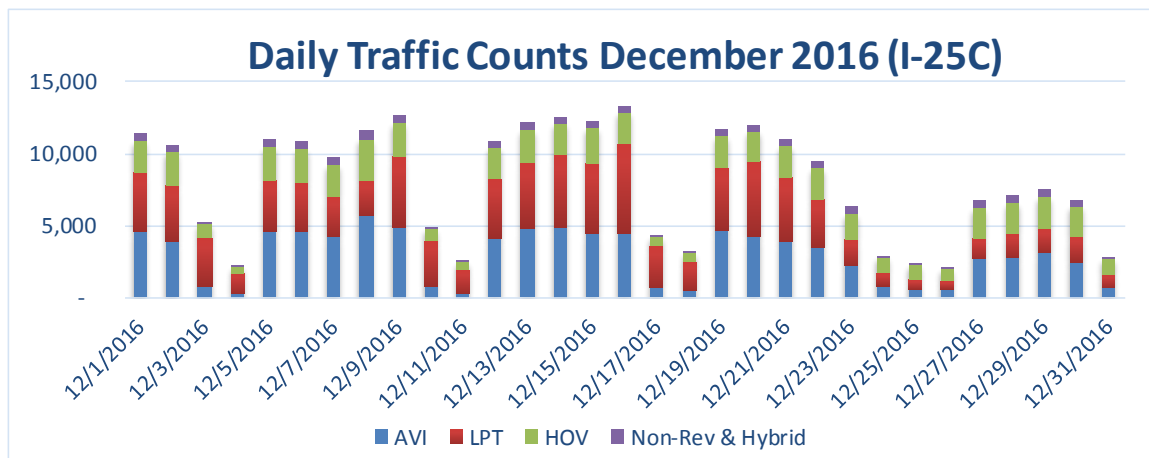


Figure 1 – Monthly Traffic Distribution



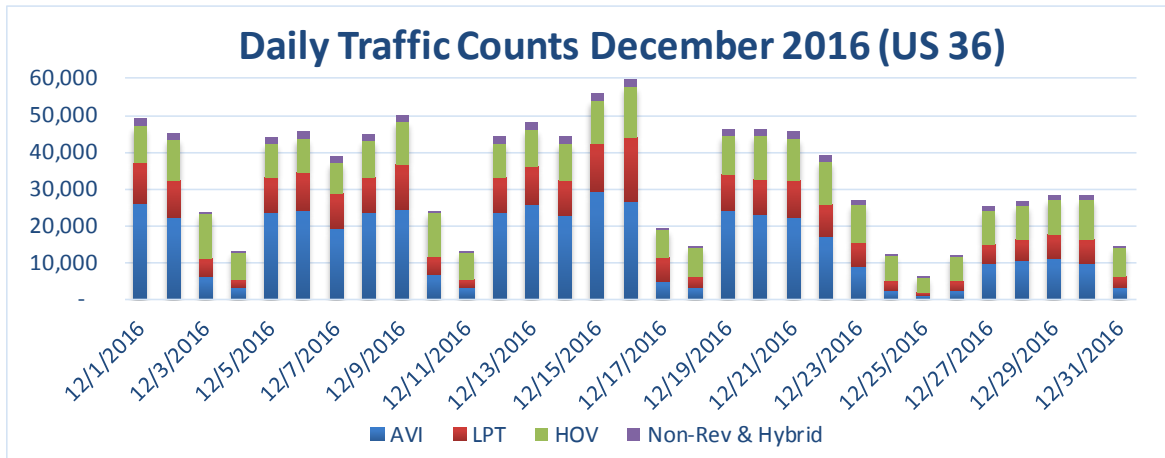


Figure 2 – Daily Traffic Counts

## 2.0 REVENUES

During the month of December 2016, PRD collected \$475,999 and \$363,281 from users of the I-25 Central and US36 Managed Lanes, respectively. For purposes of this report, revenues are recognized at the time of collection, which is typically sometime after they have been incurred for those customers who are billed based on their license plate. For example, if a single-occupant vehicle uses the lanes in October but pays in January, the associated revenue is attributed to January.

## 3.0 OPERATIONAL INCIDENTS, ISSUES, AND CLOSURES

The project had numerous routine debris removals, lighting incidents, and graffiti control during the month. The remaining routine lighting incidents are planned for repair within the allowable response period. All incidents were responded to and rectified within the allowable timeframes. The managed lanes were closed for three incidents during the month for a total of one hour and eleven minutes. Closures have exceeded the twelve hour limit and will be treated according to Section 29.7 (b) of the Concession Agreement.

Date	Start	Stop	Duration
July 6, 2016	06:53	07:05	0:12
July 12, 2016	16:32	16:54	0:22
July 14, 2016	08:27	08:39	0:12
July 15, 2016	15:47	16:32	0:45
July 20, 2016	17:45	20:15	2:30

July 23, 2016	13:30	14:10	0:40
August 5, 2016	09:13	10:11	0:58
August 26, 2016	16:25	17:36	1:11
September 16, 2016	09:00	09:20	0:20
September 16, 2016	09:54	10:35	0:41
September 28, 2016	09:20	09:31	0:11
October 4, 2016	08:15	08:58	0:43
October 4, 2016	08:26 (8:59 due to overlap)	09:14	0:15
October 26, 2016	08:33	08:57	0:24
November 8, 2016	10:05	10:40	0:35
November 10, 2016	07:30	08:12	0:42
November 21, 2016	06:54	07:19	0:25
November 23, 2016	15:14	16:15	1:01
December 8, 2016	08:58	09:47	0:49
December 9, 2016	07:06	07:22	0:16
December 9, 2016	08:10	08:16	0:06
<b>Total</b>			<b>13:18</b>
Remaining Closure Hours Available (Ref: CA 29.7)			<b>-01:18</b>

Table 2 – Managed Lanes Closures to Date

On April 8, 2016 the eastbound toll points were set to \$0.00 from 4:00 PM to 6:00 PM at the direction of HPTE. This is the first closure case within the last twelve months and it will expire on April 8, 2017.

The table below provides a listing of ETCS items recorded this month, consistent with Appendix 6-2 of Schedule 6.

Element Category	Refer-ence	Element	Performance Item	PRD Notified	Contractual Cure Period	Cure Achieved
None	N/A	N/A	N/A	N/A	N/A	N/A

Table 3 – ETCS Issues per CA Schedule 6 Appendix 6-2

The table below provides a status of all Noncompliance categories in accordance with paragraph 1.2 of Schedule 10.

Non-compliance Location	Nature	Cause	Cure Date	Uncured Non-compliance Point	Unexpired Non-compliance Point	365 Day Expiration Date	1095 Day Expiration Date
Promenade West Toll Point	Incorrect toll schedule	Incorrect Toll Schedule was applied during a software update on 3/7/16	3/16/16 (Period II) Customer Accounts Corrected	0	3	3/16/17	3/16/19

Table 4 – Status of Noncompliance Categories

#### 4.0 MEAN TIME BETWEEN FAILURE (MTBF) AND MEAN TIME TO REPAIR (MTTR)

Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR) data is provided in the table below. Only Maintained Elements that were repaired during the reporting period and had a failure type breakdown are listed in the table. We consider a breakdown to be a failure when the element cannot be used for its intended purpose until repaired.

Maintained Element	Mean Time Between Failure (MTBF) (Hours)	Mean Time To Repair (MTTR) (Hours)
None	N/A	N/A

Table 5 – Mean Time Between Failure & Mean Time To Repair

#### 5.0 HYBRID UTILIZATION

Total Hybrid Trips	
I-25 Central	1,746
US 36	6,692

Table 6 – Hybrid Utilization

Fuel efficient “Hybrid” vehicles are permitted to access the Express Lanes free of charge, regardless of occupant numbers, provided that they have obtained a permit from CDOT, obtained a Hybrid transponder from E-470, and display an E-470 Hybrid decal on the vehicle’s windshield.



OPERATIONS AND  
MAINTENANCE  
MONTHLY REPORT  
DECEMBER 2016

US 36 and I-25 Express  
Lanes Project

Prepared for:

Plenary Roads Denver, LLC  
1700 Lincoln Street, Suite 3000  
Denver, CO 80203

Attention: Mr. Simon Stachnik



Prepared By:

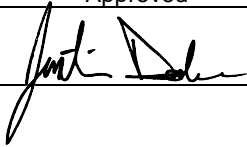
Broadspectrum  
7100-B Pennsylvania Street  
Thornton, CO 80229  
United States of America

Justin Doles, PE  
Project Manager

## OPERATIONS AND MAINTENANCE – MONTHLY REPORT

DECEMBER 2016

### *US 36 and I-25 Express Lanes Project*

Revision	Date	Approved
Rev. 0	01/08/2017	

This report titled *Operations and Maintenance Monthly Report, December 2016* has been prepared by BROADSPECTRUM for the exclusive use of Plenary Roads Denver, LLC (PRD). No other party is an intended beneficiary of this report or the information, opinions, and conclusions contained herein. Any use by any party other than PRD of any of the information, opinions, or conclusions is the sole responsibility of said party. The use of this report shall be at the sole risk of the user regardless of any fault or negligence of PRD or BROADSPECTRUM.

The information and analyses contained herein have been completed to a level of detail commensurate with the objectives of the assignment and in light of the information made available to BROADSPECTRUM at the time of preparation. This report and its supporting documentation have been reviewed and/or checked for conformance with industry-accepted norms. To the best of the information and belief of BROADSPECTRUM, the information presented in this report is accurate to within the limitations specified herein.

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The O&M Monthly Report contains all relevant information for the month of December 2016. BROADSPECTRUM continues ongoing and preventive maintenance activities for the I-25 and US36 Express Lanes Project.

## BROADSPECTRUM's Commitment to Safety

BROADSPECTRUM conducted weekly toolbox talk meetings during the month. The purpose of the tool box talks is to cover important safety items that relate to the project such as near misses, "better ways" as to how safety is conducted for the Project, and discussion on safety procedures for maintenance activities. In addition to the toolbox talks, BROADSPECTRUM conducts a weekly progress meeting. This is a forum for feedback from staff on Operations, Incident Response, and Maintenance activities.

Toolbox Talks this month included:

- Chain Saw Safety
- Dangers of Micro Sleep
- Trailer Towing Safety
- Proper Footing and Traction
- Safe Driving Pledge

## A. Summary of the Planned Maintenance Activities for the Upcoming Month – January 2017

BROADSPECTRUM has identified the upcoming planned maintenance activities as described in Table 1.7.1.3 of The Maintenance Management Plan. These activities include preventative and routine maintenance in order to successfully operate and maintain the Project. A listing of the planned maintenance activities for the month of January 2017 is included below.

Fig. A-1 Planned Maintenance Activities for January 2017

X – Indicates the day the task is planned.

Performance Standard Identification Number (Table 6.1)	Work Activity- Description	Frequency	Jan-17																														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
			S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T
ML-1	MAINTENANCE PATROL	Daily			X	X	X	X			X	X	X	X	X			X	X	X	X	X			X	X	X	X	X			X	X
ML-1	FLEXIBLE PAVEMENT OBSERVATION / REPAIR	F-52			X					X							X							X							X		
ML-1	RIGID PAVEMENT OBSERVATION / REPAIR	F-52			X					X							X							X							X		
ML-4	DELINEATORS & MARKERS OBSERVE / CLEAN / REPAIR	F-12				X																			X								
ML-2	DRAINAGE STRUCTURE (INLET) INSPECTION	F-1					X																				X						
ML-2	DRAINAGE (INLET) OBSERVE/ CLEAN / REPAIR	F-12						X																				X					
ML-6	SIGN CLEANING	F-1										X																					
ML-6	SIGN OBSERVATION / REPAIR	F-52				X						X								X							X						
ML-8	STREET LIGHTING OBSERVATION /REPAIR	F-52					X						X								X							X					
ML-8	ELECTRICAL SUPPLY INSPECTION / REPAIR	F-12						X																									
ML-8	ACCESS PANEL OBSERVATION / REPAIR	F-12						X																									
ML-10	HERBICIDE & WEED CONTROL MAINTENANCE	F-52			X					X							X							X							X		
ML-12	GRAFFITI OBSERVATION / REMOVAL	F-52			X					X							X							X							X		
ML-14	MECHANICAL ROAD SWEEPING	F-12								X	X	X	X	X																			
ML-14	LITTER OBSERVATION / REMOVAL	Daily			X	X	X	X		X	X	X	X	X			X	X	X	X	X			X	X	X	X	X			X	X	
	REVERSIBLE LANE OPERATIONS	Daily			X	X	X	X		X	X	X	X	X			X	X	X	X	X			X	X	X	X	X			X	X	

#### Frequency of Activity:

Daily – Daily Activity

F-4 – Quarterly Activity

F-52 – Weekly Activity

F-2 – Semi-Annual Activity

F-12 – Monthly Activity

F-1 – Annual Activity

## B. Summary of Performed and Completed Maintenance Activities

Fig. B-1 Performed and Complete Maintenance Activities for December 2016,

X Indicates the day of the month that the task was completed.

Performance Standard Identification Number (Table 6.1)	Work Activity- Description	Frequency	Dec-16																														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
			T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
ML-1	MAINTENANCE PATROL	Daily	X	X			X	X	X	X	X			X	X	X	X	X			X	X	X	X					X	X	X	X	
ML-1	FLEXIBLE PAVEMENT OBSERVATION / REPAIR	F-52					X						X							X									X				
ML-1	RIGID PAVEMENT OBSERVATION / REPAIR	F-52					X						X							X									X				
ML-4	DELINEATORS & MARKERS OBSERVE / CLEAN / REPAIR	F-12						X									X	X															
ML-2	DRAINAGE (INLET) OBSERVE/ CLEAN / REPAIR	F-12														X																	
ML-2	DRAINAGE (PIPE/CULVERT) OBSERVE / CLEAN / RPR	F-12																					X										
ML-6	SIGN OBSERVATION / REPAIR	F-52						X					X	X	X	X					X								X	X	X		
ML-8	STREET LIGHTING OBSERVATION /REPAIR	F-52						X						X							X									X			
ML-8	ELECTRICAL SUPPLY INSPECTION / REPAIR	F-12								X																							
ML-8	ACCESS PANEL OBSERVATION / REPAIR	F-12								X																							
ML-10	HERBICIDE & WEED CONTROL MAINTENANCE	F-52							X						X								X								X		
ML-12	GRAFFITI OBSERVATION / REMOVAL	F-52							X				X		X							X									X		
ML-14	MECHANICAL ROAD SWEEPING	F-12											X	X	X	X	X																
ML-14	LITTER OBSERVATION / REMOVAL	Daily	X	X			X	X	X	X	X			X	X	X	X	X			X	X	X	X					X	X	X	X	
	REVERSIBLE LANE OPERATIONS	Daily	X	X			X	X	X	X	X			X	X	X	X	X			X	X	X	X	X				X	X	X	X	

Fig. B-2 Work Accomplished This Month

Activity	Actual Work
202 Clean Drainage Structures (EA)	2
218 Debris in Roadway (HR)	4
218 Litter Barrel Trash Cleanup (YD3)	10
220 Sweeping (Mech) (MI)	81
222 Sweeping - Hand (HR)	20
301 Misc Sign Maint (EA)	2
304 Del Post Maintenance (EA)	24
307 Direction Gate Maint (EA)	2
314 Reversible Lane Ops (HR)	280
329 Courtesy Assistance (HR)	409.5
402 Snow Plowing & Spreading (MI)	440
540 Graffiti Removal (SF)	120

### C. Summary of Planned Maintenance that was Not Completed for the Month

Broadspectrum completed all scheduled maintenance activities for the period of December 2016. Frequencies and/or actual date of the month of some activities may have been adjusted based on actual conditions.

### D. Summary of the Maintenance Activities and Results Performed for the Month Beyond Planned Maintenance

A summary of unplanned maintenance activities provided below:

Snow and Ice Control:

Precipitation Event Start		Equipment Deployed		Precipitation Event End		Service Level "A" Achieved in ML		Service Level "B" Achieved in GP	
12/6/2016	19:30	12/6/2016	16:15	12/8/2016	8:00	12/7/2016	13:15	12/7/2016	13:15
12/16/2016	19:15	12/16/2016	18:30	12/17/2016	17:48	12/17/2016	15:30	12/17/2016	16:00

Courtesy Patrol: None

Hazardous Materials Incidents: None

## E. Operating Contractor's Incident Response Logs Related to Maintenance Activities

This section provides a summary of Broadspectrum's performance related to the Performance and Measurement Criteria listed in Appendix 6-1.1 of the Operating Contract.

The table below provides a listing of items recorded this month:

Element Category	Description	Location	BRS Notified	Response to Defects		
				Category 1		Category 2
				Hazard Mitigation	Permanent Remedy	Permanent Repair
GP 1.0	Debris (Nothing Found)	MP 57.00 WB	12/29/2016 07:35:00	Reqd: 1 Hours Resp: 12/29/2016 07:40 Actual: 0.08 Hours	N/A	N/A
GP 1.1	Debris (Metal In Lanes)	MP 51.10 WB	12/29/2016 11:00:00	Reqd: 1 Hours Resp: 12/29/2016 11:20 Actual: 0.33 Hours	N/A	N/A
GP 12.1	Graffiti (On Wall)	MP 55.80 WB	12/12/2016 10:00:00	N/A	Reqd: 10 Days Resp: 12/12/2016 11:30 Actual: 0.06 Days	N/A
GP 1.1	Debris (Sign Panels In Lanes)	MP 44.65 WB	12/25/2016 12:45:00	Reqd: 1 Hours Resp: 12/25/2016 13:33 Actual: 0.79 Hours	N/A	N/A
GP 1.1	Debris (Tarp In Lanes)	MP 45.80 WB	12/28/2016 07:10:00	Reqd: 1 Hours Resp: 12/28/2016 07:30 Actual: 0.33 Hours	N/A	N/A
GP 1.1	Debris (Xmas Tree In Lanes)	MP 56.80 WB	12/29/2016 05:30:00	Reqd: 1 Hours Resp: 12/29/2016 06:00 Actual: 0.50 Hours	N/A	N/A
GP 1.1	Debris (Wood In Lanes)	MP 54.70 WB	12/13/2016 08:18:00	Reqd: 1 Hours Resp: 12/13/2016 08:35 Actual: 0.28 Hours	N/A	N/A
GP 1.1	Debris (Tire In Lanes)	MP 44.60 WB	12/13/2016 08:49:00	Reqd: 1 Hours Resp: 12/13/2016 09:00 Actual: 0.18 Hours	N/A	N/A
GP 1.1	Debris (Debris In Lanes)	MP 45.80 EB	12/12/2016 14:32:00	Reqd: 1 Hours Resp: 12/12/2016 14:45 Actual: 0.21 Hours	N/A	N/A
GP 1.1	Debris (Ladder In Lanes)	MP 47.90 WB	12/5/2016 12:30:00	Reqd: 1 Hours Resp: 12/5/2016 12:50 Actual: 0.33 Hours	N/A	N/A
GP 1.1	Debris (Chain In Lanes)	48.40-52.70 EB	12/3/2016 13:01:00	Reqd: 1 Hours Resp: 12/3/2016 13:40 Actual: 0.65 Hours	N/A	N/A
GP 5.1	Guardrail (Missing Lag Bolt)	040-U36-GSI- ENDT- 050_920R, MP 50.92 WB	11/28/2016 13:00:00	N/A	N/A	Reqd: 6 Months Resp: -- Actual: In Progress
GP 5.1	Guardrail (End Treatment Reset)	040-U36-GSI- ENDT- 046_910R, MP 46.91 WB	11/28/2016 13:00:00	N/A	N/A	Reqd: 6 Months Resp: -- Actual: In Progress
GP 5.1	Guardrail (End Markers)	MP 44.60 to 57.00	11/28/2016 13:00:00	N/A	N/A	Reqd: 6 Months Resp: -- Actual: In Progress
GP 14.2	Litter (Cleared from Roadside)	MP 57.00 - 44.60	12/1/2016 12:00:00	N/A	N/A	Reqd: 28 Days Resp: 12/29/2016 21:00 Actual: 28.37 Days
GP 5.1	Guardrail (End Treatment Reset)	040-U36-GSI- ENDT- 054_980L, MP 54.98 EB	11/28/2016 13:00:00	N/A	N/A	Reqd: 6 Months Resp: -- Actual: In Progress

Element Category	Description	Location	BRS Notified	Response to Defects		
				Category 1		Category 2
				Hazard Mitigation	Permanent Remedy	Permanent Repair
GP 5.1	Guardrail (Missing Lag Bolt)	040-U36-GSI-ENDT-052_580R, MP 52.58 WB	11/28/2016 13:00:00	N/A	N/A	Reqd: 6 Months Respd: -- Actual: In Progress
ML 8.1	Lighting (West Bulb)	040-U36-LHT-0170, MP 56.30	10/31/2016 13:00:00	N/A	N/A	Reqd: 6 Months Respd: -- Actual: In Progress
ML 8.1	Lighting (North and South Bulbs)	040-U36-LHT-0160, MP 56.20	10/31/2016 13:00:00	N/A	N/A	Reqd: 6 Months Respd: -- Actual: In Progress
ML 8.1	Lighting (All Bulbs)	040-I25-LHT-0090, MP 214.90	10/31/2016 13:00:00	N/A	N/A	Reqd: 6 Months Respd: -- Actual: In Progress
ML 8.1	Lighting (All Bulbs)	040-I25-LHT-0050, MP 214.70	10/31/2016 13:00:00	N/A	N/A	Reqd: 6 Months Respd: -- Actual: In Progress
ML 8.1	Lighting (North Bulb)	040-I25-LHT-0020, MP 214.50	10/31/2016 13:00:00	N/A	N/A	Reqd: 6 Months Respd: -- Actual: In Progress

All items were completed within the required response time. Items that are *In Progress* are still within the allowed response time.

## F. Detailed Results of All Inspections, Assessments, and Testing Activities

During this reporting period there were no special inspections, assessments, or testing results outside normal operating condition.

## G. Monthly Toll System Performance Reports

Toll system operated within proposed parameters per BROADSPECTRUM's observations.

## H. Preventative Maintenance Plan and Progress

Preventative Maintenance work is contingent on Initial Works Package implementation.

## I, J. Mean Time between Failure (MTBF), Mean Time To Repair (MTTR)

No Maintained Elements experienced a failure type breakdown this month. BROADSPECTRUM considers a breakdown to be a failure when the element cannot be used for its intended purpose until repaired.



## Appendix 1 – Photographs

### Traffic Signs (GP/ML 6.1)



## Safety Barriers (ML 5.1)

