Regional Transportation Agency of Central Maryland

Serving: Howard County, Anne Arundel County, City of Laurel and Northern Prince George's County

System Map

Effective: July 2018

schematic map
not to scale

RTA Route Names

201	201	*Arundel Mills – Freetown Village*
301	301	*Towne Centre Laurel – South Laurel*
302	302	*Towne Centre Laurel – College Park Metro Station*
401	401	*Columbia Mall – Howard County Hospital – HCC*
404	404	*HCC – Howard County Hospital – Kings Contrivance*
405	405	*Center Park Drive – Ellicott City*
406	406	*Columbia Mall – Columbia Gateway Drive*
407	407	*Columbia Mall – Kings Contrivance*
408	408	*Columbia Mall – MD Food Center*
409	409	*Laurel Mall – MD Food Center*
409B	409B	*North Laurel Community Center – MD Food Center*
501	501	*Columbia Mall – Arundel Mills Mall*
502	502	*Towne Centre Laurel – Maryland City*
503	503	*Towne Centre Laurel – The Mall in Columbia*
504	504	*Savage MARC – Fort Meade - Odenton MARC*

Routes 201, 302, 404, 407, 408
Certain trips, see schedule for service details

Other Operators

75 — *MARYLAND MTA Local/Express*

320 — *MARYLAND MTA Commuter Bus*

AA-202 — *ANNE ARUNDEL COUNTY*
call 410-222-7440/410-222-0225 or visit: www.aacounty.org/Transportation

87 — *WMATA Metrobus*

CC — COUNTY Connector
FREE County Connector Shuttle: Arundel Mills to BWI Airport 410-859-1000 or visit bwipartner.org/countyconnector

Rail Service

MARC TRAIN — *Camden Line*, *Penn Line*

MTA LIGHT RAIL — *Hunt Valley – BWI Line*

METRORAIL — *Green, Yellow Lines*

Map Symbols

- Transfer Point
  transfer from RTA to Maryland MTA, WMATA Metrobus at this location
- Point of Interest
- VC Village Center
- Library
- Medical Center/Hospital
- Park & Ride

Prince George's County

Fleet Maintenance Audit

Thirty-one (31) Buses

Conducted September 29 - October 1, 2018

October 3, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-one (31) Buses
Conducted September 29 – October 1, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-one (31) Buses
Conducted September 29 – October 1, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on September 29 – October 1, 2018 by TRC for Prince George's County. Forty (40) buses were scheduled for a fleet inspection and maintenance record review; however, nine (9) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62628/transmission, Bus 62644/engine, Bus 63092/air conditioning, Bus 63142/engine, Bus 63189/accident, Bus 63194/accident, Bus 63208/engine, and Bus 63215/accident. The number of buses not available for inspection has been increasing and is cause for concern.

The results of this current audit are as follows:

Total Defects	133
Average Defects per Bus	4.29
Total Class "A" Safety-Related Defects	125
Average Class "A" Safety-Related Defects per Bus	4.03

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results show a continued increase in Class "A" defects over the long-term average.

Engine compartment defects and Steering/Suspension defects continue to increase with no observable plan for improvement.

The condition of the fleet is deteriorating and poses unnecessary risk to the County and its riders. TRC recommends immediate corrective action.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-one (31) buses received a physical inspection during this audit. Table 1 below identifies these 31 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62617	2011	Gillig
62618	2012	Gillig
62622	2011	Gillig
62627	2011	Gillig
62630	2011	Gillig
62631	2011	Gillig
62634	2011	Gillig
62635	2011	Gillig
62636	2011	Gillig
62638	2011	Gillig
62639	2012	Gillig
62645	2012	Gillig
62647	2012	Gillig
62648	2012	Gillig
62651	2012	Gillig
62652	2012	Gillig
63140	2007	Gillig
63143	2007	Gillig
63148	2007	Gillig
63163	2008	Gillig
63168	2008	Gillig
63197	2010	Gillig
63199	2010	Gillig
63202	2010	Gillig
63204	2010	Gillig
63205	2010	Gillig
63206	2010	Gillig
63209	2010	Gillig
63210	2010	Gillig
63211	2010	Gillig
63214	2010	Gillig

Table 2 which follows identifies the nine buses that were not available for inspection. *The number of buses not available for inspection has been increasing in the past few audits and is cause for concern.*

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62624	2011	Gillig	Accident
62628	2011	Gillig	Transmission
62644	2012	Gillig	Engine
63092	2006	Gillig	Air Conditioning
63142	2007	Gillig	Engine
63189	2009	Gillig	Accident
63194	2009	Gillig	Accident
63208	2010	Gillig	Engine
63215	2010	Gillig	Accident

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment

15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-one (31) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-one (31) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

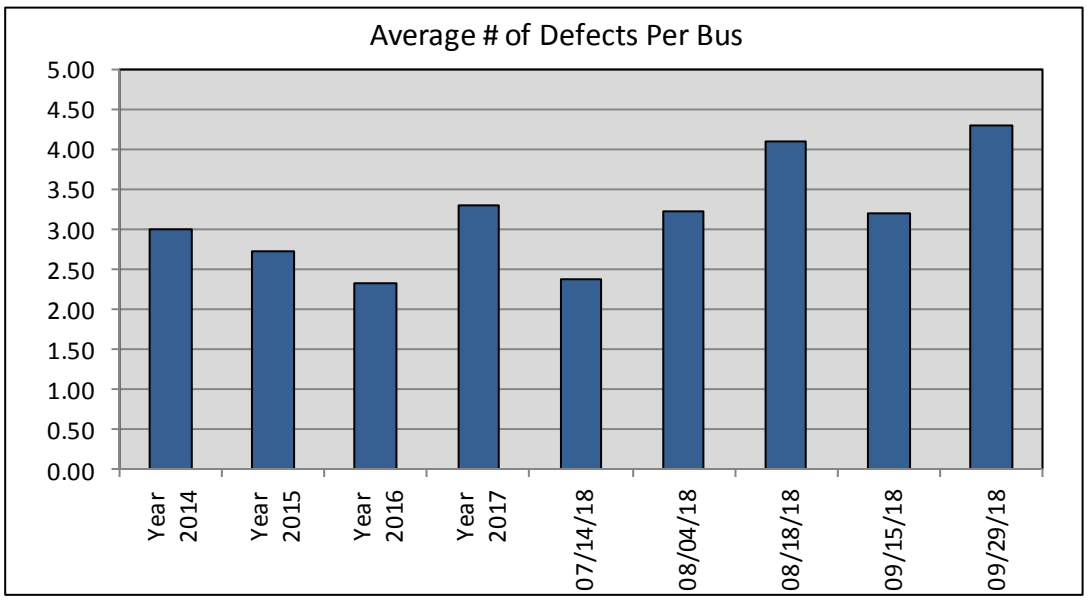
Overall Fleet Condition

One hundred & thirty-three (133) defects were found during this current audit, or 4.29 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14–16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75
Aug. 18–20, 2018	98	4.08	81	3.38
Sept. 15-17, 2018	105	3.18	90	2.73
Sept. 29–Oct. 1, 2018	**133**	**4.29**	**125**	**4.03**

As can be seen from Table 3 above and the chart below, when compared to past audits, the 4.29 average defects per bus found during this current inspection is higher than at any time since TRC first began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The condition of the fleet is rapidly deteriorating, exposing the County to unnecessary risk.**



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Suspension/Steering, Tires, and Transmission categories. Once again, the Engine Compartment category and the Suspension/Steering category comprised nearly three-quarters of all defects (73%). These categories show persistent increases. Engine compartment defects increased to a total of 69 defects from 50 defects last audit, and the Suspension/Steering category increased to 28 defects from 19 defects last audit. **Engine Compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recommends immediate corrective action to reduce defects in these categories.**

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern are highlighted in Table 4 below.

Table 4

Summary of Defects by Category	Year 2014 Avg	Year 2015 Avg	Year 2016 Avg	Year 2017 Avg	7/14/18	8/04/18	8/18/18	9/15/18	10/1/18	
Accessibility Features	7	2	3	3	3	4	3	3	2	
Air System/Brake System	15	8	7	7	2	3	7	8	4	
Climate Control	2	0	0	1	0	0	0	0	0	
Destination Signs	1	0	0	0	0	0	0	0	0	
Differential	1	1	1	1	1	0	0	0	0	
Driver's Controls	5	2	1	2	0	2	0	1	0	
Electrical System	2	1	1	1	1	0	1	0	0	
Engine Compartment	36	27	24	34	18	34	29	50	69	⇦
Exhaust	0	0	0	0	0	0	0	0	0	
Exterior Body Condition	15	18	12	12	8	18	18	14	9	
Interior Condition	13	13	4	10	2	1	2	3	2	
Lights	7	6	5	6	2	3	10	1	4	
Passenger Controls	1	1	1	2	0	2	2	0	1	
Safety Equipment	7	4	1	1	0	0	0	0	0	
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0	0	0	0	
Suspension/Steering	10	10	10	19	21	28	26	19	28	⇦
Tires	3	1	3	2	1	4	0	3	2	
Transmission	2	2	2	1	0	4	0	3	12	
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**	**98**	**105**	**133**	
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**	**4.08**	**3.18**	**4.29**	

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are*

not actually capturing defects. A review of inspector's qualifications and training is recommended.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

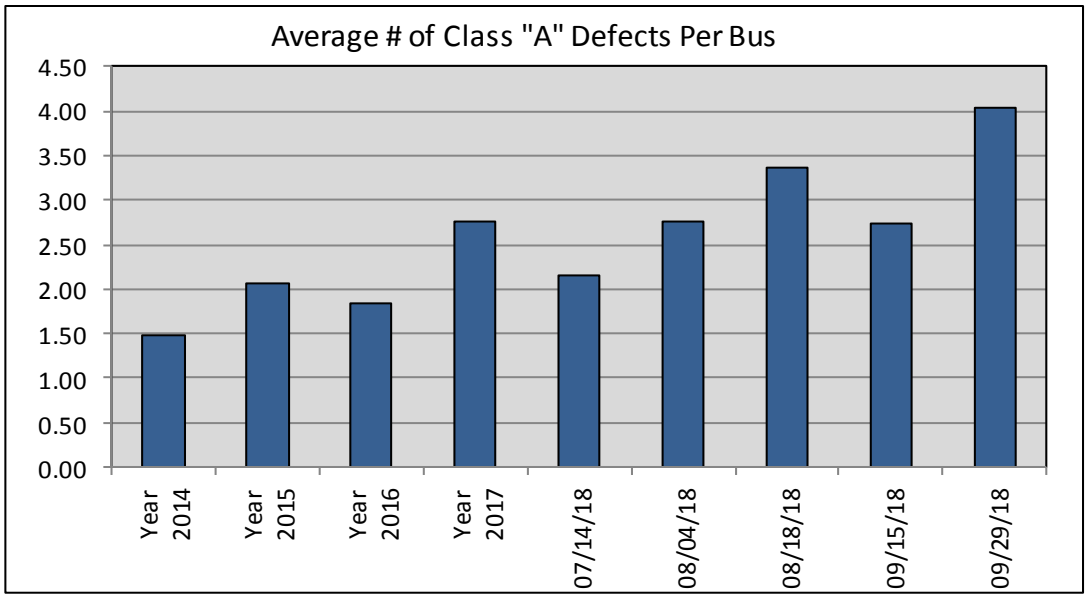
One hundred & twenty-five (125) Class "A" safety-related defects were found during this inspection, for an average of 4.03 Class "A" safety-related defects per bus. The 125 Class "A" defects found during this current audit are listed in Table 5 which follows.

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62617	2011	Gillig	Oil leak, engine compartment, vent tube leaking above oil pressure switch
62617	2011	Gillig	Brakes, rear, out of adjustment
62618	2012	Gillig	Radius rod, C/S rear upper, worn
62618	2012	Gillig	Tire, C/S rear inner, worn
62622	2011	Gillig	Alternator belt, engine compartment, cracked
62622	2011	Gillig	Radius rods, both rear upper, worn
62622	2011	Gillig	Coolant line bracket, engine compartment, both bolts broken in transmission
62627	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62627	2011	Gillig	Radius rods, both rear upper, worn
62630	2011	Gillig	A/C belt, engine compartment, cracked
62630	2011	Gillig	Alternator belt, engine compartment, cracked
62630	2011	Gillig	Water pump belt, engine compartment, cracked
62630	2011	Gillig	Oil leak, engine compartment, rear main seal leaking
62630	2011	Gillig	Oil leak, engine compartment, oil filler tube leaking at block
62634	2011	Gillig	Water pump belt, engine compartment, cracked
62634	2011	Gillig	Alternator belt, engine compartment, cracked
62634	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62634	2011	Gillig	Oil leak, engine compartment, steering pump leaking
62634	2011	Gillig	Coolant leak, engine compartment, water pump leaking
62634	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62634	2011	Gillig	Oil leak, engine compartment, alternator seal leaking
62635	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62635	2011	Gillig	Oil leak, engine compartment, pan drain plug leaking
62636	2011	Gillig	Radius rod, C/S rear upper, worn
62636	2011	Gillig	Oil leak, engine compartment, turbo return line leaking
62636	2011	Gillig	Oil leak, engine compartment, dip stick tube leaking
62638	2011	Gillig	A/C belt, engine compartment, cracked
62638	2011	Gillig	Alternator belt, engine compartment, cracked
62638	2011	Gillig	Oil leak, transmission, oil pan leaking
62638	2011	Gillig	Oil leak, steering, hydraulic reservoir leaking
62638	2011	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
62638	2011	Gillig	Oil leak, engine compartment, rear main seal leaking
62638	2011	Gillig	Radius rods, both rear lower, worn
62639	2012	Gillig	Radius rods, both rear lower, worn
62639	2012	Gillig	Oil leak, engine compartment, oil filler tube leaking at block
62639	2012	Gillig	Oil leak, transmission, oil pan leaking
62639	2012	Gillig	Oil leak, transmission, dip stick tube leaking
62639	2012	Gillig	Windshield, S/S, cracked
62645	2012	Gillig	Windshield, S/S, BB hole
62645	2012	Gillig	Radius rods, both rear lower, worn
62645	2012	Gillig	Oil leak, engine compartment, plastic tube above oil pressure switch leaking
62647	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62647	2012	Gillig	Radius rods, C/S rear lower, worn
62647	2012	Gillig	A/C belt, engine compartment, cracked
62647	2012	Gillig	Alternator belt, engine compartment, cracked

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62648	2012	Gillig	Radius rod, S/S rear lower, worn
62648	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62651	2012	Gillig	Oil leak, engine compartment, dip stick tube leaking
62651	2012	Gillig	Oil leak, engine compartment, oil filler tube leaking
62652	2012	Gillig	Radius rods, both rear lower, worn
62652	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62652	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62652	2012	Gillig	Oil leak, engine compartment, alternator body leaking
63140	2007	Gillig	Oil leak, engine compartment, alternator leaking at both ends
63140	2007	Gillig	Radius rod, C/S rear upper, worn
63140	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63143	2007	Gillig	Water pump belt, engine compartment, noisy bearing noise
63143	2007	Gillig	Courtesy lights, by #3 & #4 doors, inop
63143	2007	Gillig	Oil leak, front, gear box leaking
63143	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63148	2007	Gillig	W/C lift safety strip, rear, inop
63148	2007	Gillig	Sway bar bushings, front, worn
63148	2007	Gillig	Alternator belt, engine compartment, cracked
63148	2007	Gillig	Radius rods, both rear lower, worn
63148	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63148	2007	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63163	2008	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63163	2008	Gillig	Oil leak, engine compartment, oil filler tube leaking
63163	2008	Gillig	Oil leak, engine compartment, timing chain cover leaking
63168	2008	Gillig	King pins, both, worn
63168	2008	Gillig	Oil leak, engine compartment, pan drain plug leaking
63168	2008	Gillig	Coolant leak, engine compartment, coolant line above air compressor leaking
63168	2008	Gillig	Dome lamps, S/S #1 & #2, inop
63197	2010	Gillig	A/C belt, engine compartment, cracked
63197	2010	Gillig	Flooring, forward of hatch, coming up (trip hazard)
63197	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63197	2010	Gillig	Oil leak, engine compartment, hydraulic fan leaking
63197	2010	Gillig	Radius rod, S/S rear lower, worn
63199	2010	Gillig	W/C ramp, front, very slow
63199	2010	Gillig	King pins, both, worn
63199	2010	Gillig	Tire, S/S rear inner, worn
63199	2010	Gillig	Radius rods, both rear lower, worn
63199	2010	Gillig	Oil leak, transmission, pan drain plug leaking
63199	2010	Gillig	Oil leak, air system, oil leak between air compressor & hydraulic pump
63199	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63202	2010	Gillig	Brake chamber, S/S rear, hanging up / won't release
63202	2010	Gillig	Drag link, at pitman arm, worn
63202	2010	Gillig	Coolant pipe bracket, engine compartment, broken
63202	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
			dirty)
63202	2010	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63202	2010	Gillig	Dome lamp, S/S #1, inop
63202	2010	Gillig	Oil leak, engine compartment, alternator end plate gasket leaking
63204	2010	Gillig	Radius rods, both rear, worn
63204	2010	Gillig	Oil leak, engine compartment, oil pan gasket & drain plug leaking
63204	2010	Gillig	Oil leak, engine compartment dip stick tube leaking
63204	2010	Gillig	Oil leak, engine compartment, oil cooler leaking
63205	2010	Gillig	Oil leak, engine compartment, alternator seal & end plate gasket leaking
63205	2010	Gillig	Oil leak, engine compartment, timing chain cover leaking
63205	2010	Gillig	Oil leak, engine compartment, oil cooler leaking
63205	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63205	2010	Gillig	Oil leak, engine compartment, dip stick tube leaking
63206	2010	Gillig	Oil leak, front, gear box leaking
63206	2010	Gillig	Alternator belt, engine compartment, cracked
63206	2010	Gillig	Water pump belt, engine compartment, cracked
63206	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63209	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63209	2010	Gillig	Oil leak, engine compartment, alternator body leaking
63210	2010	Gillig	Bell cord, S/S rear, broken
63210	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63210	2010	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63210	2010	Gillig	Drag link, at pitman arm, worn
63210	2010	Gillig	Oil leak, engine compartment, alternator end plate leaking
63210	2010	Gillig	Chamber hoses, rear, rubbing / chaffing against each other
63211	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63211	2010	Gillig	Oil leak, engine compartment, cylinder head leaking
63211	2010	Gillig	Oil leak, engine compartment, alternator seal leaking
63211	2010	Gillig	Drag link, at pitman arm, worn
63211	2010	Gillig	Radius rods, both rear lower, worn
63211	2010	Gillig	Hydraulic line, @ pump, robbing
63211	2010	Gillig	Coolant pipe bracket, engine compartment, bolt broken
63214	2010	Gillig	Fuel leak, engine compartment, top of engine leaking
63214	2010	Gillig	Radius rods, both rear lower, worn
63214	2010	Gillig	Oil leak, engine compartment, oil cooler leaking
63214	2010	Gillig	Drag link, at pitman arm, worn
63214	2010	Gillig	Dome lamp, C/S #5, inop

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 4.03 average Class "A" defects per bus found during this current inspection is higher than at any time since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The number of safety-critical defects is increasing, exposing the County and its riders to unnecessary risk.**



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-one (31) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

SUMMARY OF RECOMMENDATIONS

One hundred & twenty-five (125) Class "A" safety-related defects were found during this current audit, or 4.03 average Class "A" defects per bus. **Overall, the fleet is deteriorating and placing the County at increased risk for vehicle fires and accidents**. The number of Class "A" defects per bus found in the audit is the highest

since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC recommends that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class A defects in this category was 28 during this current audit compared to 19 last audit. This could be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of fifty one (51) engine compartment oil leak defects compared to forty (40) engine compartment oil leak defects last audit, two (2) coolant leak defects compared to one (1) coolant leak defect last audit, and one (1) fuel leak defect this audit.

- TRC recommends a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Thirty-three (33) Buses

Conducted September 15 - 17, 2018

September 19, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-three (33) Buses
Conducted September 15 - 17, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-three (33) Buses
Conducted September 15 - 17, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on September 15 - 17, 2018 by TRC for Prince George's County. Forty-three (43) buses were scheduled for a fleet inspection and maintenance record review; however, ten (10) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62644/engine, Bus 63090/retired, Bus 63092/wheelchair lift, Bus 63142/engine, Bus 63168/at vendor, Bus 63170/retired, Bus 63194/accident, Bus 63208/at vendor, and Bus 63215/transmission.

- The results of this current audit are as follows:

Total Defects	105
Average Defects per Bus	3.18
Total Class "A" Safety-Related Defects	90
Average Class "A" Safety-Related Defects per Bus	2.73

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, August 18 – 20, 2018, and September 15 – 17, 2018 audit results. Results show a continued increase in Class "A" defects over the long-term average.

- The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected.

- Positive observations from this audit include the following:
    - Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
    - PMI records were well organized and easy to locate;
    - All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-three (33) buses received a physical inspection during this audit. Table 1 below identifies these 33 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62620	2011	Gillig
62621	2011	Gillig
62625	2011	Gillig
62626	2011	Gillig
62629	2011	Gillig
62632	2011	Gillig
62633	2011	Gillig
62637	2011	Gillig
62640	2012	Gillig
61642	2012	Gillig
62643	2012	Gillig
62646	2012	Gillig
62650	2012	Gillig
63149	2007	Gillig
63151	2007	Gillig
63160	2008	Gillig
63161	2008	Gillig
63162	2008	Gillig
63164	2008	Gillig
63165	2008	Gillig
63166	2008	Gillig
63167	2008	Gillig
63169	2008	Gillig
63190	2009	Gillig
63193	2009	Gillig
63198	2010	Gillig
63201	2010	Gillig
63203	2010	Gillig
63207	2010	Gillig
63212	2010	Gillig
63213	2010	Gillig
63216	2010	Gillig
63217	2010	Gillig

Table 2 below identifies the ten buses that were not available for inspection.

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62624	2011	Gillig	Accident
62644	2012	Gillig	Engine
63090	2006	Gillig	Retired
63092	2006	Gillig	Wheelchair Lift
63142	2007	Gillig	Engine
63168	2008	Gillig	At Vendor
63170	2008	Gillig	Retired
63194	2009	Gillig	Accident
63208	2010	Gillig	At Vendor
63215	2010	Gillig	Transmission

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls

14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-three (33) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-three (33) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

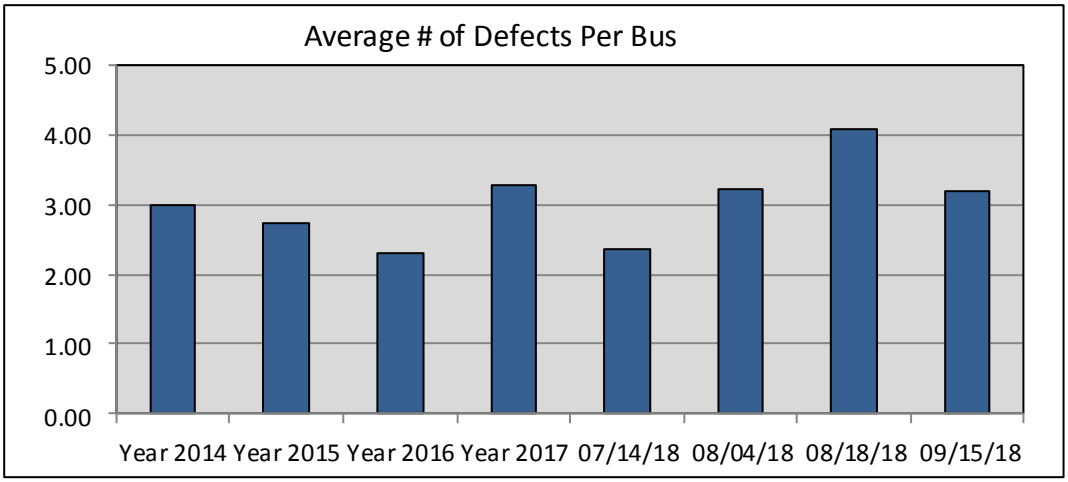
Overall Fleet Condition

One hundred & five (105) defects were found during this current audit, or 3.18 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, August 18 – 20, 2018, and September 15 – 17, 2018 audit results. The table also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, August 18 – 2018, and September 15 – 17, 2018 audit results.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14–16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75
Aug. 18–20, 2018	98	4.08	81	3.38
Sept. 15-17, 2018	105	3.18	90	2.73

As can be seen from Table 3 above and the chart below, the 3.18 average defects per bus found during this current inspection is down when compared to the average defects per bus found during the August 18 – 20, 2018 audit, the August 4 – 6, 2018 audit, and the average defects per bus for Year 2017, however, is up when compared to the average defects per bus found during the July 14 – 16, 2018 audit and the audit average defects per bus for Year 2014, Year 2015, and Year 2016.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment category, once again, showed the most defects during this audit, with a total of 50 defects compared to 29 Engine Compartment defects last audit, followed by the Suspension/Steering category with a total of 19 defects compared to 26 Suspension/Steering defects last audit.

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, and August 18 – 20, 2018 audit results. Critical areas of concern are highlighted in Table 4 below.

Table 4

Summary of Defects by Category	Year 2014 Average	Year 2015 Average	Year 2016 Average	Year 2017 Average	7/14/18	8/04/18	8/18/18	9/15/18
Accessibility Features	7	2	3	3	3	4	3	3
Air System/Brake System	15	8	7	7	2	3	7	8
Climate Control	2	0	0	1	0	0	0	0
Destination Signs	1	0	0	0	0	0	0	0
Differential	1	1	1	1	1	0	0	0
Driver's Controls	5	2	1	2	0	2	0	1
Electrical System	2	1	1	1	1	0	1	0
Engine Compartment	36	27	24	34	18	34	29	50
Exhaust	0	0	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8	18	18	14
Interior Condition	13	13	4	10	2	1	2	3
Lights	7	6	5	6	2	3	10	1
Passenger Controls	1	1	1	2	0	2	2	0
Safety Equipment	7	4	1	1	0	0	0	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0	0	0
Suspension/Steering	10	10	10	19	21	28	26	19
Tires	3	1	3	2	1	4	0	3
Transmission	2	2	2	1	0	4	0	3
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**	**98**	**105**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**	**4.08**	**3.18**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Ninety (90) Class "A" safety-related defects were found during this inspection, for an average of 2.73 Class "A" safety-related defects per bus. The ninety (90) Class "A" defects found during this current audit are listed in Table 5 below.

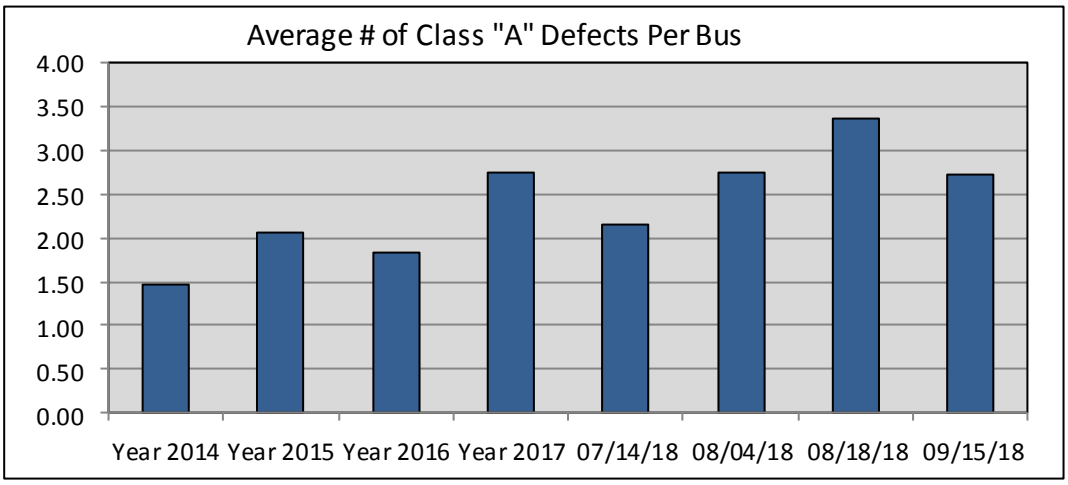
Table 5

Bus #	Year	Make	Class "A" Defects
62620	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62620	2011	Gillig	Windshield, S/S, cracked
62621	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks / engine dirty
62625	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62625	2011	Gillig	Oil leak, engine compartment, timing chain cover leaking
62625	2011	Gillig	Dome light, C/S #1, inop
62626	2011	Gillig	A/C belt, engine compartment, cracked
62626	2011	Gillig	Water pump belt, engine compartment, damaged

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62629	2011	Gillig	Windshield, S/S, BB hole
62632	2011	Gillig	All belts, engine compartment, cracked
62633	2011	Gillig	Air tanks, bottom, full of oil
62633	2011	Gillig	Radius rods, both rear lower, worn
62633	2011	Gillig	Oil leak, engine compartment, oil filler tube leaking at block
62637	2011	Gillig	Oil leak, engine compartment, oil filter leaking
62637	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62637	2011	Gillig	Oil leak, engine compartment, oil leak between air compressor & steering pump
62640	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62640	2012	Gillig	Oil leak, engine compartment, oil pressure switch leaking
62640	2012	Gillig	Oil leak, engine compartment, timing chain cover leaking
62640	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62640	2012	Gillig	Brakes, both front, knocking noise when applying brakes (possible flat spot of roller (replaced by mechanic)
61642	2012	Gillig	Alternator belt, engine compartment, cracked
61642	2012	Gillig	Water pump belt, engine compartment, damaged
61642	2012	Gillig	Oil leak, engine compartment, alternator seals leaking
61642	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
61642	2012	Gillig	Radius rods, C/S rear lower, worn
62643	2012	Gillig	Radius rods, both rear lower, worn
62646	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62646	2012	Gillig	Flooring, around floor hatch, coming up / trip hazard
62646	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62646	2012	Gillig	Oil leak, engine compartment, oil leak between A/C compressor & hydraulic pump leaking
62650	2012	Gillig	Oil leak, air system, air compressor mounting gasket leaking
62650	2012	Gillig	Oil leak, transmission, oil lines leaking @ oil pan
63149	2007	Gillig	Windshield, S/S, BB hole
63151	2007	Gillig	Oil leak, front, gear box leaking
63151	2007	Gillig	Wheelchair lift, front, inop
63151	2007	Gillig	Coolant leak, @ engine block, coolant pipe hose leaking
63160	2008	Gillig	Radius rod, S/S rear lower, worn
63160	2008	Gillig	Oil leak, engine compartment, hydraulic fan solenoid valve line leaking
63160	2008	Gillig	Brake chamber, C/S rear, hanging at times / won't release
63161	2008	Gillig	Alternator belt, engine compartment, cracked
63161	2008	Gillig	Air tanks, all, full of water
63161	2008	Gillig	Oil leak, engine compartment, oil filler tube leaking
63161	2008	Gillig	Oil leak, engine compartment, oil cooler leaking
63161	2008	Gillig	Oil leak, engine compartment, oil leak above air compressor
63162	2008	Gillig	Radius rods, both rear lower, worn
63162	2008	Gillig	Tire, S/S rear inner, worn
63162	2008	Gillig	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63162	2008	Gillig	Windshield washer, driver's controls, inop
63164	2008	Gillig	Radius rod, S/S rear lower, worn
63164	2008	Gillig	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63165	2008	Gillig	Air tanks, all, full of water

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63165	2008	Gillig	Air leak, rear, relay valve leaking when brakes applied
63165	2008	Gillig	Radius rods, both rear lower, worn
63165	2008	Gillig	Wheelchair ramp, front, operates very slowly
63165	2008	Gillig	Wheelchair ramp, front, won't sit flush with floor / trip hazard
63166	2008	Gillig	A/C belt, engine compartment, cracked
63169	2008	Gillig	Oil leak, engine compartment, hydraulic fan line leaking
63169	2008	Gillig	Oil leak, engine compartment, C/S seal leaking
63169	2008	Gillig	Oil leak, engine compartment, rear main seal leaking
63169	2008	Gillig	Air dryer, bottom, inop
63190	2009	Gillig	Radius rods, both rear lower, worn
63190	2009	Gillig	Drag link, at pitman arm, worn
63193	2009	Gillig	Tire, C/S rear inner, worn
63193	2009	Gillig	Tire, S/S rear outer, worn
63193	2009	Gillig	Radius rod, C/S rear upper, worn
63193	2009	Gillig	Radius rod, S/S rear lower, worn
63198	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63198	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63198	2010	Gillig	Oil leak, engine compartment, oil leak at hydraulic line pump
63201	2010	Gillig	A/C belt, engine compartment, cracked
63201	2010	Gillig	Drag link, at pitman arm, worn
63201	2010	Gillig	Radius rod, S/S rear lower, worn
63201	2010	Gillig	Oil leak, transmission, leaking from top
63203	2010	Gillig	Belts, engine compartment, all belts cracked
63207	2010	Gillig	A/C belt, engine compartment, cracked
63207	2010	Gillig	Drag link, at pitman arm, worn
63207	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63207	2010	Gillig	Oil leak, engine compartment, oil pan drain plug leaking
63212	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63212	2010	Gillig	Drag link, at pitman arm, worn
63213	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63213	2010	Gillig	Oil leak, engine compartment, oil filler tube leaking @ block
63213	2010	Gillig	Radius rods, all rear lower, worn
63216	2010	Gillig	Radius rods, both rear lower, worn
63216	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63216	2010	Gillig	Oil leak, engine compartment, timing chain cover leaking
63216	2010	Gillig	Oil leak, engine compartment, oil filer tube leaking @ block
63217	2010	Gillig	Radius rods, both rear lower, worn
63217	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 90 Class "A" defects found during this current inspection is down when compared to the August 18 – 20, 2018 audit, the August 4 – 6, 2018 audit, and the average Class "A" defects per bus for Year 2017, however, is up when compared to the July 14 – 16, 2018 audit and the average Class "A" defects per bus for Year 2014, Year 2015, and Year 2016.



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-three (33) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts.

SUMMARY OF RECOMMENDATIONS

- Ninety (90) Class "A" safety-related defects were found during this current audit, or 2.73 average Class "A" defects per bus, compared to 3.38 average Class "A" defects per bus the previous audit. TRC continues to recommend that Prince George's County work with Transdev to come up with a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC recommends that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class A defects in this category was 19 and may be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of forty (40) engine compartment oil leak defects and one (1) coolant leak defect.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Thirty-four (34) Buses

Conducted October 13 - 15, 2018

October 17, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-four (34) Buses
Conducted October 13 – 15, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-four (34) Buses
Conducted October 13 – 15, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on October 13 - 15, 2018 by TRC for Prince George's County. Forty-three (43) buses were scheduled for a fleet inspection and maintenance record review; however, nine (9) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62628/transmission, Bus 62644/engine, Bus 63092/air conditioning & wheelchair, Bus 63168/air compressor, Bus 63189/accident, Bus 63194/accident, Bus 63198/rear main seal leak, and Bus 63215/transmission. The number of buses not available for inspection has been increasing the past several audits and is cause for concern.

The results of this current audit are as follows:

Total Defects	129
Average Defects per Bus	3.79
Total Class "A" Safety-Related Defects	120
Average Class "A" Safety-Related Defects per Bus	3.53

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results show a continued increase in Class "A" defects over the long-term average. Note that nearly all defects found were Class A defects.

Engine compartment defects and Steering/Suspension defects continue to increase with no observable plan for improvement.

The condition of the fleet is deteriorating and poses unnecessary risk to the County and its riders. TRC recommends immediate corrective action.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-four (34) buses received a physical inspection during this audit. Table 1 below identifies these 34 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62617	2011	Gillig
62619	2011	Gillig
62623	2012	Gillig
62633	2011	Gillig
62641	2012	Gillig
62642	2012	Gillig
62646	2012	Gillig
62649	2012	Gillig
62650	2012	Gillig
62652	2012	Gillig
63139	2007	Gillig
63141	2007	Gillig
63142	2007	Gillig
63144	2007	Gillig
63145	2007	Gillig
63146	2007	Gillig
63147	2007	Gillig
63148	2007	Gillig
63150	2007	Gillig
63159	2008	Gillig
63160	2008	Gillig
63161	2008	Gillig
63188	2009	Gillig
63191	2009	Gillig
63192	2010	Gillig
63195	2009	Gillig
63196	2010	Gillig
63200	2010	Gillig
63204	2010	Gillig
63208	2010	Gillig
63210	2010	Gillig
63211	2010	Gillig
63212	2010	Gillig
63217	2010	Gillig

Table 2 which follows identifies the nine buses that were not available for inspection. *The number of buses not available for inspection has been increasing the past few audits and is cause for concern.*

Table 2 Buses Not Available for Inspection			
BUSES NOT INSPECTED	**MODEL YEAR**	**VEHICLE MAKE**	**REASON**
62624	2011	Gillig	Accident
62628	2011	Gillig	Transmission
62644	2012	Gillig	Engine
63092	2006	Gillig	A/C & wheelchair
63168	2008	Gillig	Air compressor
63189	2009	Gillig	Accident
63194	2009	Gillig	Accident
63198	2010	Gillig	Rear main seal leak
63215	2010	Gillig	Transmission

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-four (34) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-four (34) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

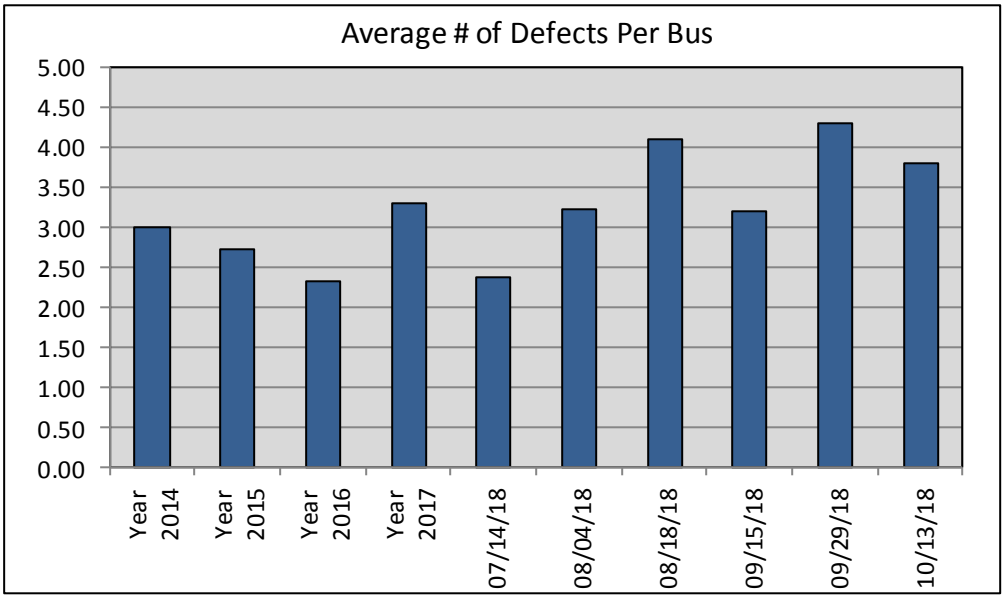
Overall Fleet Condition

One hundred & twenty-nine (129) defects were found during this current audit, or 3.79 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14–16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75
Aug. 18–20, 2018	98	4.08	81	3.38
Sept. 15-17, 2018	105	3.18	90	2.73
Sept. 29–Oct. 1, 2018	133	4.29	125	4.03
Oct. 13 – 15, 2018	**129**	**3.79**	**120**	**3.53**

As can be seen from Table 3 above and the chart below, when compared to past audits, the 3.79 average defects per bus found during this current inspection is the third highest average defects per bus since TRC first began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The condition of the fleet is rapidly deteriorating, exposing the County to unnecessary risk.**



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Differential, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Suspension/Steering, Tires, and Transmission categories. Once again, the Engine Compartment category and the Suspension/Steering category comprised nearly three-quarters of all defects (68%). Engine compartment defects decreased slightly with a total of 60 defects compared to 69 defects last audit, and the number of Suspension/Steering category defects remained the same when compared to the 28 defects experienced during the last audit. **Engine Compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recommends immediate corrective action to reduce defects in these categories.**

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern are highlighted in Table 4 below.

Table 4

Summary of Defects by Category	Year 2014 Avg	Year 2015 Avg	Year 2016 Avg	Year 2017 Avg	7/14/18	8/04/18	8/18/18	9/15/18	10/1/18	10/1318
Accessibility Features	7	2	3	3	3	4	3	3	2	2
Air System/Brake System	15	8	7	7	2	3	7	8	4	7
Climate Control	2	0	0	1	0	0	0	0	0	0
Destination Signs	1	0	0	0	0	0	0	0	0	0
Differential	1	1	1	1	1	0	0	0	0	1
Driver's Controls	5	2	1	2	0	2	0	1	0	0
Electrical System	2	1	1	1	1	0	1	0	0	0
Engine Compartment	36	27	24	34	18	34	29	50	69	60
Exhaust	0	0	0	0	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8	18	18	14	9	11
Interior Condition	13	13	4	10	2	1	2	3	2	2
Lights	7	6	5	6	2	3	10	1	4	8
Passenger Controls	1	1	1	2	0	2	2	0	1	4
Safety Equipment	7	4	1	1	0	0	0	0	0	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0	0	0	0	0
Suspension/Steering	10	10	10	19	21	28	26	19	28	28
Tires	3	1	3	2	1	4	0	3	2	4
Transmission	2	2	2	1	0	4	0	3	12	2
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**	**98**	**105**	**133**	**129**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**	**4.08**	**3.18**	**4.29**	**3.79**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are*

not actually capturing defects. A review of inspector's qualifications and training is recommended.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

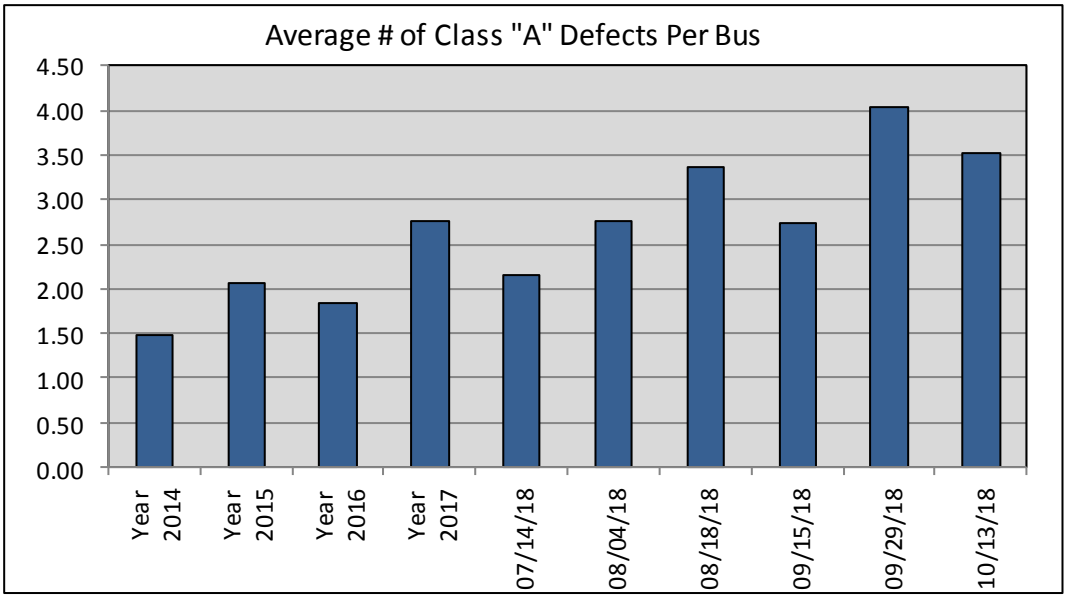
One hundred twenty (120) Class "A" safety-related defects were found during this inspection, for an average of 3.53 Class "A" safety-related defects per bus. The 120 Class "A" defects found during this current audit are listed in Table 5 which follows.

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62617	2011	Gillig	Radius rods, rear upper, both worn
62617	2011	Gillig	Coolant leak, engine compartment, air compressor coolant hose leaking (secured by mechanic)
62619	2011	Gillig	Oil leak, engine compartment, rear main seal leaking
62619	2011	Gillig	Oil leak, engine compartment, oil pan damaged & leaking
62623	2012	Gillig	A/C belt, engine compartment, cracked
62623	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62623	2012	Gillig	Oil leak, engine compartment, air compressor gasket leaking
62623	2012	Gillig	Air tank, engine compartment, sludge build up
62623	2012	Gillig	Flooring, on floor hatch & around hatch, coming up / trip hazard
62623	2012	Gillig	King pin, S/S, worn
62633	2011	Gillig	Oil leak, engine compartment, alternator end plate gasket leaking
62633	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62633	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62641	2012	Gillig	Oil leak, engine compartment, alternator end plate leaking
62641	2012	Gillig	A/C belt, engine compartment, cracked
62641	2012	Gillig	Alternator belt, engine compartment, cracked
62641	2012	Gillig	Oil leak, engine compartment, gear box leaking
62641	2012	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
62641	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62641	2012	Gillig	Oil leak, engine compartment, timing chain cover leaking
62642	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62646	2012	Gillig	Alternator belt, engine compartment, cracked
62646	2012	Gillig	King pin, S/S, worn
62646	2012	Gillig	Radius rods, both rear lower, worn
62646	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62646	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62646	2012	Gillig	Oil leak, engine compartment, air compressor gasket in between hydraulic pump leaking
62649	2012	Gillig	Alternator belt, engine compartment, cracked
62650	2012	Gillig	Radius rods, both rear lower, worn
62650	2012	Gillig	Tire, S/S rear inner, worn
62650	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62652	2012	Gillig	Oil leak, engine compartment, oil pressure switch leaking
62652	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62652	2012	Gillig	Radius rods, both rear lower, worn
62652	2012	Gillig	Radius rod, S/S rear upper, worn
63139	2007	Gillig	Radius rods, S/S upper & lower front, worn
63139	2007	Gillig	Oil leak, engine compartment, hydraulic fan line leaking
63139	2007	Gillig	Oil leak, engine compartment, alternator seal leaking
63141	2007	Gillig	Oil leak, engine compartment, alternator seal leaking
63141	2007	Gillig	A/C belt, engine compartment, cracked
63141	2007	Gillig	Radius rods, both front lower, worn
63141	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63141	2007	Gillig	Tire, C/S rear outer, flat (replaced by mechanic)

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63142	2007	Gillig	Tire, S/S front, worn (replaced by mechanic)
63142	2007	Gillig	Radius rods, all front, worn
63142	2007	Gillig	Radius rods, both lower rear, worn
63142	2007	Gillig	Coolant leak, S/S of engine, coolant leak
63144	2007	Gillig	Wheelchair lift safety strips, both, inop
63144	2007	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63145	2007	Gillig	Radius rod, C/S front lower, worn
63145	2007	Gillig	Oil leak, front, gear box leaking
63145	2007	Gillig	Stop requests, all, inop
63145	2007	Gillig	Dome lamps, C/S #1 - #2 & S/S #1 - #2, inop
63146	2007	Gillig	Oil leak, engine comp0artment, hydraulic fan motor leaking
63147	2007	Gillig	Dome lamps, C/S #2 & S/S #2, inop
63147	2007	Gillig	Coolant leak, engine compartment, circulating pump leaking
63147	2007	Gillig	Radius rods, S/S rear lower, worn
63147	2007	Gillig	Radius rods, C/S rear upper, worn
63148	2007	Gillig	Wheelchair lift restraint, front, won't go down (repaired by mechanic)
63148	2007	Gillig	Oil leak, engine compartment, oil leaking between air compressor & hydraulic pump
63150	2007	Gillig	A/C belt, engine compartment, cracked
63150	2007	Gillig	Dome lamps, S/S #3, #4 & #5, inop
63150	2007	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63159	2008	Gillig	Dome lamp, C/S #5, inop
63159	2008	Gillig	Passenger signal cord, both sides, broken
63159	2008	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63160	2008	Gillig	Oil leak, engine compartment, hydraulic fan relay leaking
63160	2008	Gillig	Radius rods, S/S rear lower, worn
63161	2008	Gillig	Alternator belt, engine compartment, cracked
63161	2008	Gillig	Oil leak, engine compartment, alternator leaking @ both ends
63161	2008	Gillig	Oil leak, engine compartment, A/C compressor leaking
63161	2008	Gillig	Air leak, S/S front, air bag leaking
63161	2008	Gillig	Radius rod, S/S rear lower, worn
63161	2008	Gillig	Oil leak, engine compartment, oil cooler leaking
63161	2008	Gillig	Oil leak, engine compartment, oil filler tube leaking
63161	2008	Gillig	Air tank, all, full of water / check air dryer
63188	2009	Gillig	Passenger signal cord, C/S, broken
63188	2009	Gillig	Drag link, @ pitman arm, worn
63188	2009	Gillig	Radius rods, both rear lower, worn
63188	2009	Gillig	Oil leak, engine compartment, oil cooler leaking
63188	2009	Gillig	Oil leak, engine compartment, oil filter leaking
63191	2009	Gillig	Oil leak, engine compartment, alternator end plate gasket leaking
63191	2009	Gillig	King pins, both, worn
63191	2009	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63191	2009	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63192	2010	Gillig	Air tanks, all, full of water

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63195	2009	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63195	2009	Gillig	Dome lamp, C/S #3, inop (repaired by mechanic)
63196	2010	Gillig	Drag link, @ pitman arm, worn
63196	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63200	2010	Gillig	A/C belt, engine compartment, cracked
63200	2010	Gillig	Flooring, around hatch, coming up / trip hazard
63200	2010	Gillig	Windshield, S/S, chipped
63200	2010	Gillig	Radius rods, both rear lower, worn
63200	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63204	2010	Gillig	Radius rods, both rear lower, worn
63204	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63204	2010	Gillig	Dome lamp, C/S #3, inop
63208	2010	Gillig	Radius rods, both front lower, worn
63208	2010	Gillig	Radius rods, both rear lower, worn
63208	2010	Gillig	Oil leak, rear, gasket leaking
63208	2010	Gillig	Touch tape, S/S flip-up seat, inop
63210	2010	Gillig	A/C belt, engine compartment, cracked
63210	2010	Gillig	Oil leak, engine compartment, alternator leaking @ both ends
63210	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63210	2010	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63211	2010	Gillig	Oil leak, engine compartment, timing chain cover leaking
63211	2010	Gillig	Oil leak, engine compartment, valve cover leaking (bottom of engine full of oil)
63211	2010	Gillig	ABS light, dashboard, on steady
63211	2010	Gillig	Dome lamp, C/S #4, inop
63211	2010	Gillig	Windshield, S/S, cracked
63212	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63212	2010	Gillig	Tires, S/S rear, worn
63217	2010	Gillig	Oil leak, front engine compartment, alternator seal leaking
63217	2010	Gillig	Radis rods, both rear lower, worn
63217	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63217	2010	Gillig	King pins, broth front, worn
63217	2010	Gillig	Coolant leak, engine compartment @ block, coolant pipe hose leaking
63188	2009	Gillig	Oil leak, engine compartment, rear main seal leaking
63192	2010	Gillig	Dome lamp, S/S #5, intermittent

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 3.53 average Class "A" defects per bus found during this current inspection is the second highest average Class "A" defects per bus experienced since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The number of safety-critical defects is increasing, exposing the County and its riders to unnecessary risk.**



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-four (34) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

SUMMARY OF RECOMMENDATIONS

One hundred & twenty (120) Class "A" safety-related defects were found during this current audit, or 3.53 average Class "A" defects per bus compared to 125, or 4.03 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus found during this current audit is the second highest since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014, with the highest average number of Class "A" defects being found during the

previous audit (September 29 – October 1, 2018). **Overall, the fleet is deteriorating and placing the County at increased risk for vehicle fires and accidents**.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC recommends that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class "A" defects in this category was 28 during this current audit, unchanged from last audit. This could be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of forty-seven (47) engine compartment oil leak defects compared to 51 engine compartment oil leak defects last audit and two (2) coolant leak defects compared to two coolant leak defects last audit.

- TRC recommends a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Twenty-five (25) Buses

Conducted July 14 - 16, 2018

July 18, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-five (25) Buses
Conducted July 14 – 16, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-five (25) Buses
Conducted July 14 – 16, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. The last inspection was conducted on December 16 -18, 2017 This report presents the findings of the maintenance audit conducted July 14 – 16, 2018 by TRC for Prince George's County. Twenty-nine (29) buses were scheduled for a fleet inspection and maintenance record review; however, four (4) buses were not available for inspection due to the following reasons: Bus 62624/in body shop, Bus 62643/brakes, Bus 63092/would not start, and Bus 63192/transmission.

- The results of this current audit are as follows:

Total Defects	59
Average Defects per Bus	2.36
Total Class "A" Safety-Related Defects	54
Average Class "A" Safety-Related Defects per Bus	2.16

  The Audit Trend Comparison table, which can be found on Page 4, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the July 14 – 16, 2018 audit results.

- The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected.
- Positive observations from this audit include the following:
  - Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
  - PMI records were well organized and easy to locate;
  - Total number of defects decreased from last audit.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Twenty-five (25) buses received a physical inspection during this audit. Table 1 below identifies these 25 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62620	2011	Gillig
62621	2011	Gillig
62625	2011	Gillig
62626	2011	Gillig
62629	2011	Gillig
62632	2011	Gillig
62637	2011	Gillig
62640	2012	Gillig
62641	2012	Gillig
62642	2012	Gillig
62649	2012	Gillig
62650	2012	Gillig
63146	2007	Gillig
63147	2007	Gillig
63151	2007	Gillig
63160	2008	Gillig
63166	2008	Gillig
63167	2008	Gillig
63191	2009	Gillig
63203	2010	Gillig
63207	2010	Gillig
63208	2010	Gillig
63215	2010	Gillig
63216	2010	Gillig
63217	2010	Gillig

Table 2 below identifies the four buses which were not available for inspection.

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE
62624	2011	Gillig
62643	2012	Gillig
63092	2006	Gillig
63192	2010	Gillig

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Alusine Kanu, and Anthony Greenfield. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided

Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-five (25) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-five (25) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

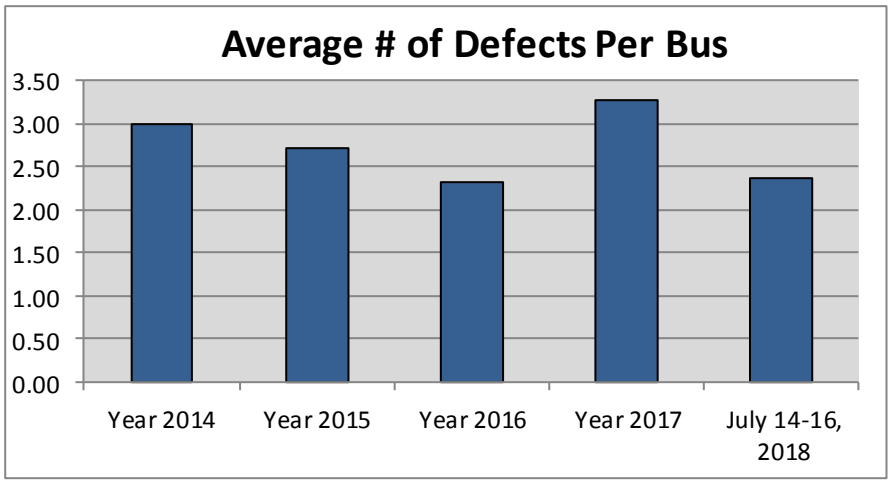
FINDINGS

Overall Fleet Condition

A total of fifty-nine (59) defects were found during this current audit, or 2.36 average defects per bus. The Audit Trend Comparison table below shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018 audit results. The table also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and July 14 – 16, 2018 audit results.

Table 3 Audit Trend Comparison				
Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July14-16,2018	59	2.36	54	2.16

As can be seen from Table 3 above and the chart below, the 2.36 average defects per bus found during this current inspection is lower than Year 2014, Year 2015, and Year 2017 averages, however, is slightly higher than Year 2016 average. Although this result shows an improvement over last year, there is insufficient data to determine if this improvement shows a sustained downward trend. Future results will provide additional data to make this determination.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Differential, Electrical Systems, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, and Tires categories. The Suspension/Steering category showed the most defects with a total of 21 defects, followed by the Engine Compartment category with a total of 18 defects.

Table 4 below compares key performance indicators from this current audit to the audit results for Year 2014, Year 2015, Year 2016, and Year 2017.

Table 4					
Summary of Defects by Category	**Year 2014 Average Per Audit**	**Year 2015 Average Per Audit**	**Year 2016 Average Per Audit**	**Year 2017 Average Per Audit**	**7/14/18**
Accessibility Features	7	2	3	3	3
Air System/Brake System	15	8	7	7	2
Climate Control	2	0	0	1	0
Destination Signs	1	0	0	0	0
Differential	1	1	1	1	1
Driver's Controls	5	2	1	2	0
Electrical System	2	1	1	1	1
Engine Compartment	36	27	24	34	18
Exhaust	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8
Interior Condition	13	13	4	10	2
Lights	7	6	5	6	2
Passenger Controls	1	1	1	2	0
Safety Equipment	7	4	1	1	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0
Suspension/Steering	10	10	10	19	21
Tires	3	1	3	2	1
Transmission	2	2	2	1	0
Total Defects	**126**	**98**	**74**	**105**	**59**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects

- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

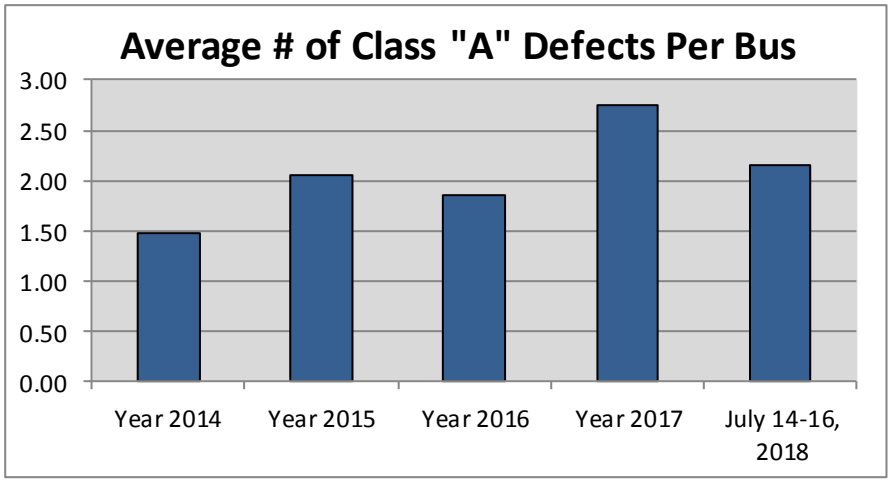
Fifty-four (54) Class "A" safety-related defects were found during this inspection, for an average of 2.16 Class "A" safety-related defects per bus. The fifty-four (54) Class "A" defects found during this current audit are listed in Table 5 which follows.

Table 5

Bus #	Year	Make	Class "A" Defects
62620	2011	Gillig	Radius rods, front, all front radius rods worn
62620	2011	Gillig	Radius rods, rear, all rear radius rods worn
62620	2011	Gillig	Oil leak, S/S engine, oil pan leaking
62620	2011	Gillig	Trailering arm bolt, S/S rear, loose
62621	2011	Gillig	Oil leaks, bottom of engine, multiple oil leaks (engine dirty)
62621	2011	Gillig	Trailering arm bolt, S/S rear, loose
62625	2011	Gillig	Flooring, around floor hatch, torn / trip hazard
62625	2011	Gillig	Radius rods, rear, all rear radius rods worn
62625	2011	Gillig	Oil leaks, bottom of engine, multiple leaks
62626	2011	Gillig	U-joint, differential end, cap worn
62626	2011	Gillig	Radius rods, rear, all rear radius rods worn
62626	2011	Gillig	Slack adjusters, front, both front slack adjusters won't adjust
62629	2011	Gillig	Oil leak, bottom of engine, multiple oil leaks (engine dirty)
62632	2011	Gillig	Drag link, at pitman arm, worn
62632	2011	Gillig	Box cover, engine compartment, missing (replaced by mechanic)
62637	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62640	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62640	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62641	2012	Gillig	Oil leak, engine compartment, oil pan drain plug leaking

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62641	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty / could not locate source)
62642	2012	Gillig	Flooring, around rear floor hatch, torn / trip hazard
62649	2012	Gillig	Coolant leak, engine compartment, water pump leaking
62649	2012	Gillig	Fuel leak, engine compartment, #2 injector leaking (replaced by mechanic)
62650	2012	Gillig	Radius rods, rear, all rear radius rods worn
62650	2012	Gillig	Tire, C/S inner rear, worn
63146	2007	Gillig	Wheelchair lift safety strips, both, inop
63146	2007	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63147	2007	Gillig	Drag link, at pitman arm, worn
63147	2007	Gillig	Courtesy lamps,exterior front by #2 door, both inop
63147	2007	Gillig	Radius rods, rear, all rear radius rods worn
63151	2007	Gillig	Radius rods, rear, all rear radius rods worn
63151	2007	Gillig	Oil leak, at pump, hydraulic line leaking
63151	2007	Gillig	Coolant leak, engine compartment, leaking
63160	2008	Gillig	Wheelchair ramp, front, won't deploy
63160	2008	Gillig	Radius rods, rear, all rear radius rods worn
63166	2008	Gillig	Oil leak, bottom of engine, oil pan dirty (could not locate source)
63166	2008	Gillig	Drag link, at pitman arm, worn
63166	2008	Gillig	Wheelchair seat belt, S/S #1 position, missing
63167	2008	Gillig	Windshield, C/S, 2 BB holes
63167	2008	Gillig	Radius rods, front, all front radius rods worn
63191	2009	Gillig	Air tanks, bottom, full of water / air dryer not working
63191	2009	Gillig	Oil leaks, bottom of engine, multiple leaks (engine dirty / could not locate source)
63191	2009	Gillig	Radius rods, rear lower, worn
63191	2009	Gillig	Dome lamps, both sides, flickering on & off
63207	2010	Gillig	Windshield, C/S, BB hole
63208	2010	Gillig	Radius rods, front, all front radius rods worn
63208	2010	Gillig	Radius rods, rear, all rear radius rods worn
63208	2010	Gillig	Windshield, C/S & S/S, BB holes
63215	2010	Gillig	Radius rods, rear lower, both worn
63215	2010	Gillig	Drag link, at pitman arm, worn
63216	2010	Gillig	Oil leak, engine compartment, crankshaft seal leaking
63216	2010	Gillig	Oil leak, engine compartment, timing cover seal leaking
63217	2010	Gillig	Oil leaks, bottom of engine, multiple leaks (engine dirty / could not locate source)
63217	2010	Gillig	Radius rods, rear lower, worn

As can be seen in the Audit Trend Comparison table on Page 4 and the chart which follows, the 54 Class "A" defects found during this current audit decreased when compared to Year 2017, however, increased compared to Year 2014, Year 2015, and Year 2016.



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the twenty-five (25) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts.

SUMMARY OF RECOMMENDATIONS

- A total of fifty-four (54) Class "A" safety-related defects was found during this audit, or 2.16 average Class "A" defects per bus. The 2.16 average Class "A" defects per bus decreased when compared to Year 2017, however, increased when compared to Year 2014, Year 2015, and Year 2016. TRC continues to recommend that Prince George's County work with Transdev to come up with a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends special attention be placed on inspection and repair of suspension and steering components. The number of Class A defects in this category increased and may be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item.

- TRC continues to recommend that special attention be paid to the flooring defects, including worn, torn, lifting, or cracked flooring. Two (2) flooring defects were found during this audit, both being classified as "A" defects due to being tripping hazards.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Twenty-four (24) Buses

Conducted August 18 - 20, 2018

August 22, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-four (24) Buses
Conducted August 18 - 20, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-four (24) Buses
Conducted August 18 - 20, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on August 18 - 20, 2018 by TRC for Prince George's County. Thirty-three (33) buses were scheduled for a fleet inspection and maintenance record review; however, nine (9) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62633/transmission, Bus 62639/DPF filter, Bus 62644/engine, Bus 63088/retired, Bus 63096/retired, Bus 63142/oil leak, Bus 63169/EGR cooler, and Bus 63194/accident.

- The results of this current audit are as follows:

Total Defects	98
Average Defects per Bus	4.08
Total Class "A" Safety-Related Defects	81
Average Class "A" Safety-Related Defects per Bus	3.38

  The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, and August 18 – 20, 2018 audit results.

- The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected.

- Positive observations from this audit include the following:
  - Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
  - PMI records were well organized and easy to locate;
  - All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Twenty-four (24) buses received a physical inspection during this audit. Table 1 below identifies these 24 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62617	2011	Gillig
62619	2011	Gillig
62623	2012	Gillig
62641	2012	Gillig
62649	2012	Gillig
62652	2012	Gillig
63139	2007	Gillig
63141	2007	Gillig
63144	2007	Gillig
63145	2007	Gillig
63146	2007	Gillig
63147	2007	Gillig
63148	2007	Gillig
63150	2007	Gillig
63159	2008	Gillig
63188	2009	Gillig
63191	2009	Gillig
63192	2010	Gillig
63195	2009	Gillig
63196	2010	Gillig
63200	2010	Gillig
63204	2010	Gillig
63210	2010	Gillig
63211	2010	Gillig

Table 2 below identifies the nine buses which were not available for inspection.

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62624	2011	Gillig	Accident
62633	2011	Gillig	Transmission
62639	2012	Gillig	DPF filter
62644	2012	Gillig	Engine
63088	not provided	Gillig	Retired
63096	not provided	Gillig	Retired
63142	2007	Gillig	Oil leak
63169	2008	Gillig	EGR cooler
63194	2009	Gillig	Accident

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided

Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-four (24) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-four (24) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

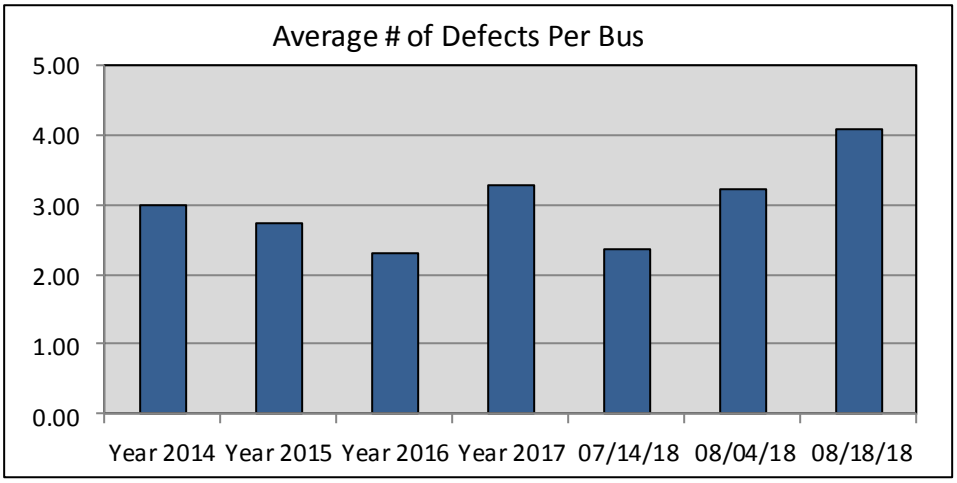
FINDINGS

Overall Fleet Condition

Ninety-eight (98) defects were found during this current audit, or 4.08 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, and August 18 – 20, 2018 audit results. The table also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, and August 18 – 2018 audit results.

Table 3 Audit Trend Comparison				
Date	**Average Defects Per Audit**	**Average Defects per Bus**	**Average Class "A" Defects Per Audit**	**Average Class "A" Defects per Bus**
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14–16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75
Aug. 18–20, 2018	98	4.08	81	3.38

As can be seen from Table 3 above and the chart below, the 4.08 average defects per bus found during this *current inspection is the highest average defects per bus experienced since TRC began conducting bi-monthly maintenance audits in 2014*. This sudden increase in "A" defects is worrisome and the root cause must be examined.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Electrical Systems, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, and Suspension/Steering categories. The Engine Compartment category, once again, showed the most defects during this audit, with a total of 29 defects compared to 34 Engine Compartment defects last audit, followed by the Suspension/Steering category with a total of 26 defects compared to 28 Suspension/Steering defects last audit.

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018 and August 4 – 6, 2018 audit results. Critical areas of concern are highlighted in Table 4 below.

Table 4							
Summary of Defects by Category	**Year 2014 Average**	**Year 2015 Average**	**Year 2016 Average**	**Year 2017 Average**	**7/14/18**	**8/04/18**	**8/18/18**
Accessibility Features	7	2	3	3	3	4	3
Air System/Brake System	15	8	7	7	2	3	7
Climate Control	2	0	0	1	0	0	0
Destination Signs	1	0	0	0	0	0	0
Differential	1	1	1	1	1	0	0
Driver's Controls	5	2	1	2	0	2	0
Electrical System	2	1	1	1	1	0	1
Engine Compartment	36	27	24	34	18	34	29
Exhaust	0	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8	18	18
Interior Condition	13	13	4	10	2	1	2
Lights	7	6	5	6	2	3	10
Passenger Controls	1	1	1	2	0	2	2
Safety Equipment	7	4	1	1	0	0	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0	0
Suspension/Steering	10	10	10	19	21	28	26
Tires	3	1	3	2	1	4	0
Transmission	2	2	2	1	0	4	0
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**	**98**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**	**4.08**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories

- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Eighty-one (81) Class "A" safety-related defects were found during this inspection, for an average of 3.38 Class "A" safety-related defects per bus. The eighty-one (81) Class "A" defects found during this current audit are listed in Table 5 below.

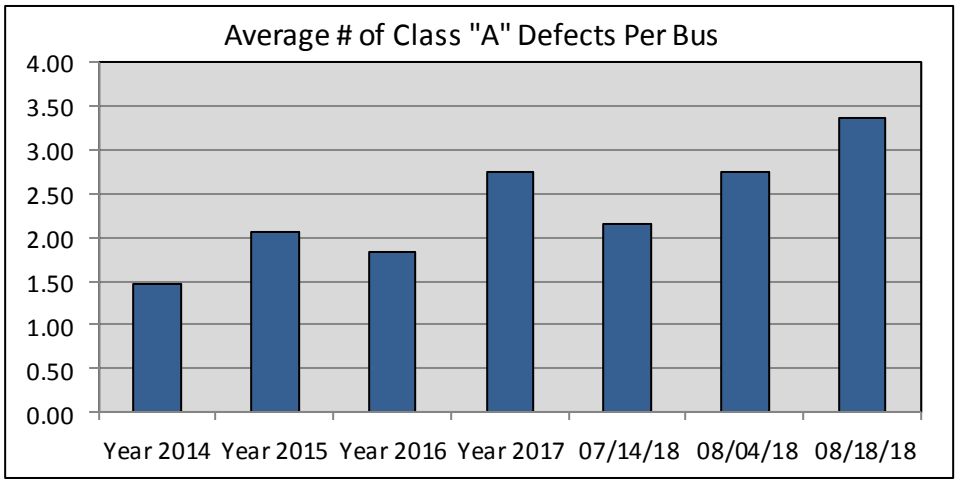
Table 5

Bus #	Year	Make	Class "A" Defects
62617	2011	Gillig	Trailering arm, C/S rear, worn
62617	2011	Gillig	Oil leak, engine compartment, hydraulic reservoir leaking
62619	2011	Gillig	Brakes, front, brake shoes worn to wear line
62619	2011	Gillig	Oil leak, air system, air compressor head gasket leaking
62623	2012	Gillig	A/C belt, engine compartment, cracked
62623	2012	Gillig	Oil leak, engine compartment, alternator front seal leaking
62623	2012	Gillig	Radius rod, C/S rear lower, worn
62623	2012	Gillig	Oil leak, engine compartment, air compressor gasket leaking
62641	2012	Gillig	Radius rods, C/S rear upper & lower, worn
62649	2012	Gillig	Radius rods, S/S rear upper, worn
62649	2012	Gillig	Oil leak, engine compartment, oil filler tube leaking
62652	2012	Gillig	Chamber mounting bracket, S/S front brakes, loose
62652	2012	Gillig	Radius rods, both rear lower, worn
62652	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
63139	2007	Gillig	Dome lamps, S/S #3, #4, #5 & C/S #5, inop
63139	2007	Gillig	Oil leak, engine compartment, fan motor leaking
63139	2007	Gillig	King pin, C/S, worn
63139	2007	Gillig	Drag link, at pitman arm, worn
63139	2007	Gillig	Radius rods, all rear, worn
63139	2007	Gillig	Stop request touch pad, S/S wheelchair position, missing
63141	2007	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63141	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63141	2007	Gillig	Radius rod, S/S rear lower, worn
63141	2007	Gillig	A/C belt, engine compartment, cracked
63144	2007	Gillig	Stepwell light, by #1 door, inop
63144	2007	Gillig	Courtesy light, by #3 & #4 doors, inop
63144	2007	Gillig	Wheelchair lift, front, safety strips inop
63144	2007	Gillig	Sway bar bushing, C/S front, worn
63144	2007	Gillig	Radius rods, both rear upper, worn
63144	2007	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63145	2007	Gillig	Wheelchair lift, front, front safety strip inop
63145	2007	Gillig	Coolant leak, engine compartment, coolant line to air compressor leaking
63146	2007	Gillig	Stepwell light, by #1 door, inop
63146	2007	Gillig	Courtesy light, by #3 & #4 doors, inop
63146	2007	Gillig	Oil leak, engine compartment, hydraulic fan leaking
63147	2007	Gillig	Stepwell light, by #2 door, inop
63147	2007	Gillig	Group strap, engine compartment to frame, broken off
63148	2007	Gillig	Sway bar bushings, front, cracked
63148	2007	Gillig	Oil leak, engine compartment, multiple oil leaks (engine dirty)
63148	2007	Gillig	Radius rods, rear lower, worn
63148	2007	Gillig	Radius rods, front lower, worn
63148	2007	Gillig	Skirt panels, S/S, damaged
63150	2007	Gillig	Dome lamps, S/S #3, #4 #5, inop
63150	2007	Gillig	Radius rods, both rear lower, worn
63159	2008	Gillig	Windshield, C/S, has BB hole
63159	2008	Gillig	Drag link, at pitman arm, worn
63188	2009	Gillig	A/C belt, engine compartment, cracked
63188	2009	Gillig	Alternator belt, engine compartment, cracked
63188	2009	Gillig	Radius rods, both front upper, worn
63188	2009	Gillig	Radius rods, both rear lower, worn
63188	2009	Gillig	Oil leak, engine compartment, rear main seal leaking
63188	2009	Gillig	Oil leak, engine compartment, oil pan leaking
63188	2009	Gillig	Oil leak, engine compartment, oil cooler leaking
63188	2009	Gillig	Dome lamps, C/S all & S/S #1, inop
63191	2009	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63191	2009	Gillig	Radius rods, both rear lower, worn
63191	2009	Gillig	Oil leak, engine compartment, oil filler tube leaking
63191	2009	Gillig	Dome lamps, S/S #1 & C/S #3 #4, inop
63192	2010	Gillig	Radius rod, S/S rear lower, worn
63195	2009	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63196	2010	Gillig	Alternator belt, engine compartment, cracked
63196	2010	Gillig	Oil leak, front, gear box leaking
63196	2010	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63196	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63196	2010	Gillig	Oil leaks, engine compartment, air compressor & hydraulic pump gasket leaking
63200	2010	Gillig	Windshield, S/S, has BB holes
63200	2010	Gillig	Radius rods, rear lower, worn
63200	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63204	2010	Gillig	Radius rods, both rear lower, worn
63204	2010	Gillig	Blow by, engine compartment, oil coming out of air box tube
63204	2010	Gillig	Oil leak, engine compartment, reservoir leaking
63210	2010	Gillig	Radius rods, front lower, both worn
63210	2010	Gillig	Air leak, S/S rear brakes, chamber hose leaking
63210	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63210	2010	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63210	2010	Gillig	Wheelchair ramp, front, won't sit flush with floor (trip hazard)
63210	2010	Gillig	Bell cord, S/S rear, not secured
63211	2010	Gillig	A/C belt, engine compartment, cracked (replaced by mechanic)
63211	2010	Gillig	Radius rods, rear, all worn
63211	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks from top of engine, oil pan, rear main seal
63211	2010	Gillig	Dome lamps, C/S #3 & #4, inop

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 81 Class "A" defects found during this current inspection is the highest average Class "A" defects per bus experienced since TRC began conducting bi-monthly maintenance audits in 2014. <u>This trend is worrisome and TRC recommends the immediate development of a plan of action to correct this trend</u>.



<u>Comfort and Convenience</u>
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

<u>Structural Integrity</u>
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the twenty-four (24) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile

intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts.

SUMMARY OF RECOMMENDATIONS

- Eighty-one (81) Class "A" safety-related defects were found during this current audit, or 3.38 average Class "A" defects per bus, compared to 2.75 average Class "A" defects per bus the previous audit. The 3.38 average Class "A" defects found during this current audit is the highest average Class "A" defects per bus experienced since TRC began conducting bi-monthly maintenance audits in 2014. TRC continues to recommend that Prince George's County work with Transdev to come up with a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class A defects in this category was 26 compared to 28 last audit and may be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of twenty-two (22) engine compartment fluid leak defects, which included engine oil, hydraulic fluid, and coolant leaks.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Thirty-two (32) Buses

Conducted August 4 - 6, 2018

August 8, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-two (32) Buses
Conducted August 4 - 6, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-two (32) Buses
Conducted August 4 - 6, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on August 4 - 6, 2018 by TRC for Prince George's County. Thirty-five (35) buses were scheduled for a fleet inspection and maintenance record review; however, three (3) buses were not available for inspection due to the following reasons: Bus 62633/transmission, Bus 62644/engine, and Bus 63142/oil leak.

- The results of this current audit are as follows:

Total Defects	103
Average Defects per Bus	3.22
Total Class "A" Safety-Related Defects	88
Average Class "A" Safety-Related Defects per Bus	2.75

  The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the July 14 – 16, 2018 and August 4 – 6, 2018 audit results.

- The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected.

- Positive observations from this audit include the following:
  - Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
  - PMI records were well organized and easy to locate;
  - All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-two (32) buses received a physical inspection during this audit. Table 1 below identifies these 32 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62617	2011	Gillig
62618	2012	Gillig
62622	2011	Gillig
62627	2011	Gillig
62628	2011	Gillig
62630	2011	Gillig
62631	2011	Gillig
62634	2011	Gillig
62635	2011	Gillig
62636	2011	Gillig
62638	2011	Gillig
62639	2012	Gillig
62645	2012	Gillig
62647	2012	Gillig
62648	2012	Gillig
62651	2012	Gillig
62652	2012	Gillig
63140	2007	Gillig
63143	2007	Gillig
63148	2007	Gillig
63163	2008	Gillig
63189	2009	Gillig
63197	2010	Gillig
63199	2010	Gillig
63202	2010	Gillig
63204	2010	Gillig
63205	2010	Gillig
63206	2010	Gillig
63209	2010	Gillig
63210	2010	Gillig
63211	2010	Gillig
63214	2010	Gillig

Table 2 below identifies the three buses which were not available for inspection.

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62633	2011	Gillig	Transmission
62644	2012	Gillig	Engine
63142	2007	Gillig	Oil leak

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-two (32) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-two (32) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

Overall Fleet Condition

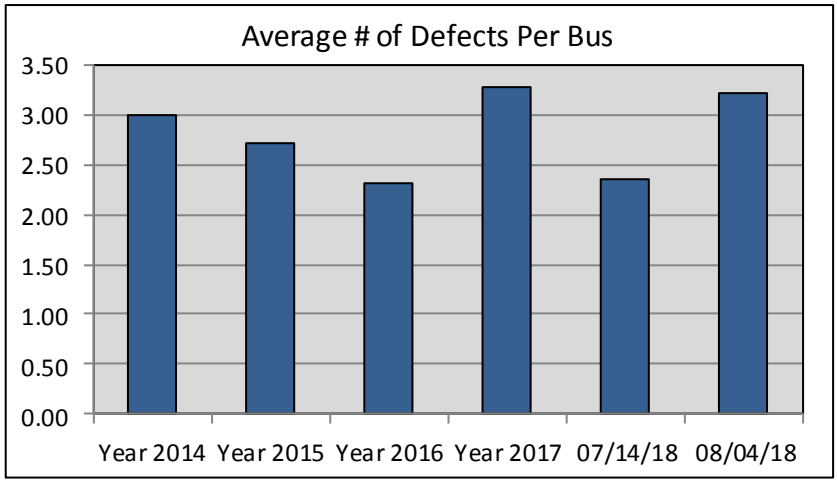
One hundred & three (103) defects were found during this current audit, or 3.22 average defects per bus. The Audit Trend Comparison table below shows the average number of defects per audit and the average number of defects per bus for the

audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018 and August 4 – 6, 2018 audit results. The table also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and July 14 – 16, 2018 and August 4 – 6, 2018 audit results.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14-16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75

As can be seen from Table 3 above and the chart below, the 3.22 average defects per bus found during this current inspection is slightly lower than the average defects per bus for Year 2017, however, is higher than the average defects per bus for Year 2014, Year 2015, Year 2016 and the July 14 – 16, 2018 audit.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment category showed the most defects during this current audit, with a total of 34 defects compared to 18 Engine Compartment defects last audit.

Table 4 below compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, and Year 2017, and the July 14-16 audit results.

Table 4						
Summary of Defects by Category	**Year 2014 Average**	**Year 2015 Average**	**Year 2016 Average**	**Year 2017 Average**	**7/14/18**	**8/0418**
Accessibility Features	7	2	3	3	3	4
Air System/Brake System	15	8	7	7	2	3
Climate Control	2	0	0	1	0	0
Destination Signs	1	0	0	0	0	0
Differential	1	1	1	1	1	0
Driver's Controls	5	2	1	2	0	2
Electrical System	2	1	1	1	1	0
Engine Compartment	36	27	24	34	18	34
Exhaust	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8	18
Interior Condition	13	13	4	10	2	1
Lights	7	6	5	6	2	3
Passenger Controls	1	1	1	2	0	2
Safety Equipment	7	4	1	1	0	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0
Suspension/Steering	10	10	10	19	21	28
Tires	3	1	3	2	1	4
Transmission	2	2	2	1	0	4
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects

- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Eighty-eight (88) Class "A" safety-related defects were found during this inspection, for an average of 2.75 Class "A" safety-related defects per bus. The eighty-eight (88) Class "A" defects found during this current audit are listed in Table 5 which follows.

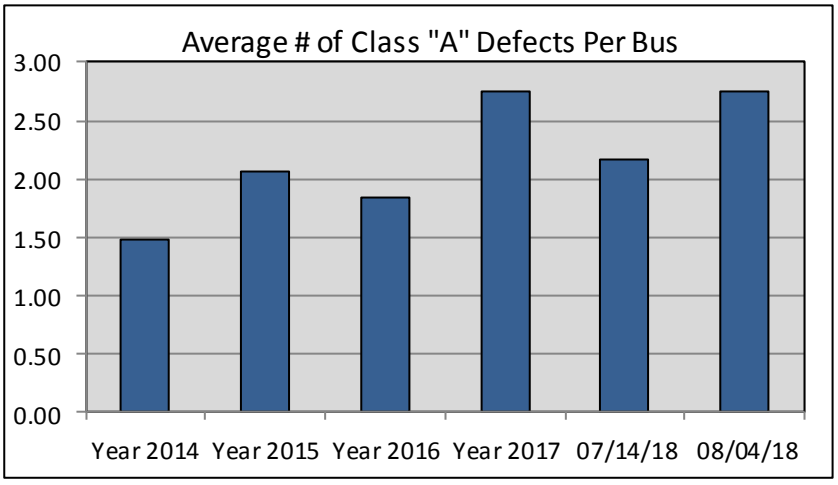
Table 5

Bus #	Year	Make	Class "A" Defects
62617	2011	Gillig	Tire, S/S rear outer, flat
62617	2011	Gillig	Radius rods, front, all worn
62618	2012	Gillig	Radius rods, rear upper, both worn
62622	2011	Gillig	Tire, C/S rear outer, damaged
62622	2011	Gillig	Radius rods, front & rear upper, worn
62627	2011	Gillig	Oil leak, steering, reservoir hose leaking
62628	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62628	2011	Gillig	Radius rod, rear lower, worn
62628	2011	Gillig	Oil leak, transmission, dip stick tube fitting @ transmission pan leaking
62630	2011	Gillig	Radius rods, rear upper, both worn
62630	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62630	2011	Gillig	Oil leak, engine compartment, alternator front seal leaking
62631	2011	Gillig	Coolant leak, engine compartment, front top of engine leaking
62635	2011	Gillig	Compartment door, battery, 1 lock missing & 1 latch broken
62635	2011	Gillig	A/C belt, engine compartment, cracked
62636	2011	Gillig	Coolant leak, engine compartment, radiator leaking
62636	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62636	2011	Gillig	Coolant leak, engine compartment, leaking from top of engine
62636	2011	Gillig	Marker lamp, C/S rear roof, inop
62638	2011	Gillig	Radius rods, rear lower, worn
62638	2011	Gillig	Oil leak, engine compartment, rear main seal leaking
62638	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62638	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62639	2012	Gillig	Radius rods, rear lower, both worn
62639	2012	Gillig	Tires, rear, all worn
62639	2012	Gillig	Drag link, at pitman arm, worn
62645	2012	Gillig	Windshield, S/S, 2 BB holes
62645	2012	Gillig	Oil leak, engine compartment, oil pressure switch leaking
62645	2012	Gillig	Drag link, at pitman arm, worn
62645	2012	Gillig	Oil leak, engine compartment, alternator front seal leaking
62645	2012	Gillig	Dome lamp, C/S #3, inop
62647	2012	Gillig	Radius rod, C/S rear lower, worn
62647	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62648	2012	Gillig	Bike rack, front, won't lock in down position
62648	2012	Gillig	Drag link, at pitman arm, worn
62648	2012	Gillig	Radius rods, front & rear, all rods worn
62648	2012	Gillig	Tires, C/S rear, worn
62648	2012	Gillig	Coolant leak, engine compartment, coolant filter leaking
62648	2012	Gillig	Window, driver's window, latch broken
62652	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62652	2012	Gillig	Oil leak, engine compartment, oil pressure switch leaking
63140	2007	Gillig	Tanks, all tanks, full of water (air dryer not working)
63140	2007	Gillig	Radius rod, rear lower, worn
63140	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks @ bottom of engine
63143	2007	Gillig	Radius rods, rear, all worn
63143	2007	Gillig	Oil leak, engine compartment, oil cooler leaking
63148	2007	Gillig	Wheelchair lift, front, intermittent
63148	2007	Gillig	Shaft coupling, front, worn
63148	2007	Gillig	Sway bar link, C/S, worn
63163	2008	Gillig	Drag link, at king pin, worn
63163	2008	Gillig	Radius rods, rear, all worn
63163	2008	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63163	2008	Gillig	Windshield, S/S, cracked
63163	2008	Gillig	Oil leak, engine compartment, fain motor leaking
63189	2009	Gillig	Oil leak, engine compartment, alternator front seal leaking
63189	2009	Gillig	King pin, C/S, worn
63189	2009	Gillig	Stop request, all, inop
63189	2009	Gillig	Oil leak, engine compartment, oil pan leaking
63189	2009	Gillig	Radius rods, rear lower, both worn
63197	2010	Gillig	Oil leak, steering, both reservoir lines leaking
63199	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63199	2010	Gillig	Radius rods, rear lower, both worn
63202	2010	Gillig	Wheelchair ramp, front, not flush with floor / trip hazard

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63202	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63202	2010	Gillig	Coolant pipe bracket, engine compartment, broken
63202	2010	Gillig	Coolant filter bracket, engine compartment, bolt missing
63204	2010	Gillig	Coolant pipe bracket, engine compartment, broken off in transmission
63204	2010	Gillig	Radius rods, rear lower, both worn
63204	2010	Gillig	Windshield washer, C/S, inop
63205	2010	Gillig	Stop request tape, C/S flip-up seat, inop
63206	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63209	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63209	2010	Gillig	Courtesy lamps, by #3 & #4 doors, inop
63210	2010	Gillig	Wheelchair ramp, front, not flush with floor / trip hazard
63210	2010	Gillig	King pin, C/S, worn
63210	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63211	2010	Gillig	Oil leak, engine compartment, dip stick tube leaking
63211	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63211	2010	Gillig	Radius rods, rear, all worn
63211	2010	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63211	2010	Gillig	Drag link, at pitman arm, worn
63214	2010	Gillig	Wheelchair ramp, front, inop
63214	2010	Gillig	Radius rods, front & rear upper, worn
63214	2010	Gillig	Oil leak, engine compartment, fan motor leaking
63214	2010	Gillig	Oil leak, engine compartment, hydraulic pump leaking
63214	2010	Gillig	Oil leak, engine compartment, oil cooler leaking
63214	2010	Gillig	Oil leak, engine compartment, oil filter leaking
63214	2010	Gillig	Wet tank, air system, no air coming out (clogged)

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 88 Class "A" defects found during this current audit inspection is the same as the average defects per bus for Year 2017 however, is higher than the average defects per bus for Year 2014, Year 2015, Year 2016 and the July 14 – 16, 2018 audit results.



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-two (32) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts.

SUMMARY OF RECOMMENDATIONS

- Eighty-eight (88) Class "A" safety-related defects were found during this audit, or 2.75 average Class "A" defects per bus. The 2.75 average Class "A" defects per bus is the same when compared to the average Class "A" defects per bus for Year 2017, however, increased when compared to the average Class "A" defects per bus for Year 2014, Year 2015, Year 2016, and the July 14 – 16, 2018 audit results. TRC continues to recommend that Prince George's County work with Transdev to come up with a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The number of Class A defects in this category increased this current audit compared to the previous audit and may be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a sharp increase in leaks including engine oil, hydraulic fluid, and coolant.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Inspection #71
Thirty-five(35) Buses

Conducted October 27 - 29, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

October 31, 2018

Prince George's County

Fleet Maintenance Audit

Thirty-one (31) Buses

Conducted September 29 - October 1, 2018

October 3, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-one (31) Buses
Conducted September 29 – October 1, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-one (31) Buses
Conducted September 29 – October 1, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on September 29 – October 1, 2018 by TRC for Prince George's County. Forty (40) buses were scheduled for a fleet inspection and maintenance record review; however, nine (9) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62628/transmission, Bus 62644/engine, Bus 63092/air conditioning, Bus 63142/engine, Bus 63189/accident, Bus 63194/accident, Bus 63208/engine, and Bus 63215/accident. The number of buses not available for inspection has been increasing and is cause for concern.

The results of this current audit are as follows:

Total Defects	133
Average Defects per Bus	4.29
Total Class "A" Safety-Related Defects	125
Average Class "A" Safety-Related Defects per Bus	4.03

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results show a continued increase in Class "A" defects over the long-term average.

Engine compartment defects and Steering/Suspension defects continue to increase with no observable plan for improvement.

The condition of the fleet is deteriorating and poses unnecessary risk to the County and its riders. TRC recommends immediate corrective action.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-one (31) buses received a physical inspection during this audit. Table 1 below identifies these 31 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62617	2011	Gillig
62618	2012	Gillig
62622	2011	Gillig
62627	2011	Gillig
62630	2011	Gillig
62631	2011	Gillig
62634	2011	Gillig
62635	2011	Gillig
62636	2011	Gillig
62638	2011	Gillig
62639	2012	Gillig
62645	2012	Gillig
62647	2012	Gillig
62648	2012	Gillig
62651	2012	Gillig
62652	2012	Gillig
63140	2007	Gillig
63143	2007	Gillig
63148	2007	Gillig
63163	2008	Gillig
63168	2008	Gillig
63197	2010	Gillig
63199	2010	Gillig
63202	2010	Gillig
63204	2010	Gillig
63205	2010	Gillig
63206	2010	Gillig
63209	2010	Gillig
63210	2010	Gillig
63211	2010	Gillig
63214	2010	Gillig

Table 2 which follows identifies the nine buses that were not available for inspection. *The number of buses not available for inspection has been increasing in the past few audits and is cause for concern.*

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62624	2011	Gillig	Accident
62628	2011	Gillig	Transmission
62644	2012	Gillig	Engine
63092	2006	Gillig	Air Conditioning
63142	2007	Gillig	Engine
63189	2009	Gillig	Accident
63194	2009	Gillig	Accident
63208	2010	Gillig	Engine
63215	2010	Gillig	Accident

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment

15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-one (31) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-one (31) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

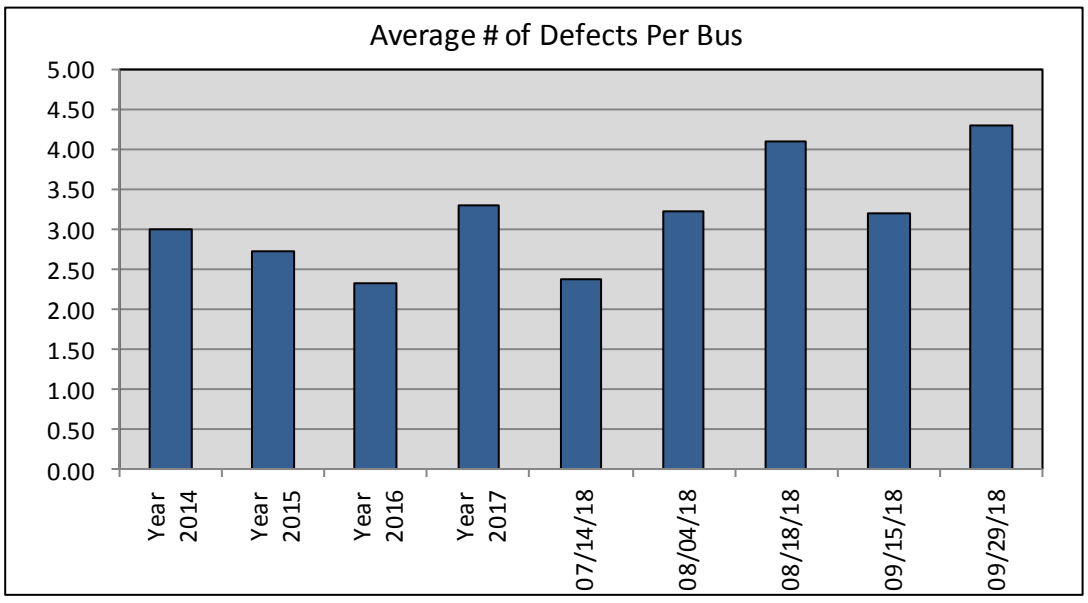
Overall Fleet Condition

One hundred & thirty-three (133) defects were found during this current audit, or 4.29 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14–16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75
Aug. 18–20, 2018	98	4.08	81	3.38
Sept. 15-17, 2018	105	3.18	90	2.73
Sept. 29–Oct. 1, 2018	**133**	**4.29**	**125**	**4.03**

As can be seen from Table 3 above and the chart below, when compared to past audits, the 4.29 average defects per bus found during this current inspection is higher than at any time since TRC first began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The condition of the fleet is rapidly deteriorating, exposing the County to unnecessary risk.**



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Suspension/Steering, Tires, and Transmission categories. Once again, the Engine Compartment category and the Suspension/Steering category comprised nearly three-quarters of all defects (73%). These categories show persistent increases. Engine compartment defects increased to a total of 69 defects from 50 defects last audit, and the Suspension/Steering category increased to 28 defects from 19 defects last audit. **Engine Compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recommends immediate corrective action to reduce defects in these categories.**

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern are highlighted in Table 4 below.

Table 4

Summary of Defects by Category	Year 2014 Avg	Year 2015 Avg	Year 2016 Avg	Year 2017 Avg	7/14/18	8/04/18	8/18/18	9/15/18	10/1/18	
Accessibility Features	7	2	3	3	3	4	3	3	2	
Air System/Brake System	15	8	7	7	2	3	7	8	4	
Climate Control	2	0	0	1	0	0	0	0	0	
Destination Signs	1	0	0	0	0	0	0	0	0	
Differential	1	1	1	1	1	0	0	0	0	
Driver's Controls	5	2	1	2	0	2	0	1	0	
Electrical System	2	1	1	1	1	0	1	0	0	
Engine Compartment	36	27	24	34	18	34	29	50	69	⇦
Exhaust	0	0	0	0	0	0	0	0	0	
Exterior Body Condition	15	18	12	12	8	18	18	14	9	
Interior Condition	13	13	4	10	2	1	2	3	2	
Lights	7	6	5	6	2	3	10	1	4	
Passenger Controls	1	1	1	2	0	2	2	0	1	
Safety Equipment	7	4	1	1	0	0	0	0	0	
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0	0	0	0	
Suspension/Steering	10	10	10	19	21	28	26	19	28	⇦
Tires	3	1	3	2	1	4	0	3	2	
Transmission	2	2	2	1	0	4	0	3	12	
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**	**98**	**105**	**133**	
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**	**4.08**	**3.18**	**4.29**	

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are*

not actually capturing defects. A review of inspector's qualifications and training is recommended.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

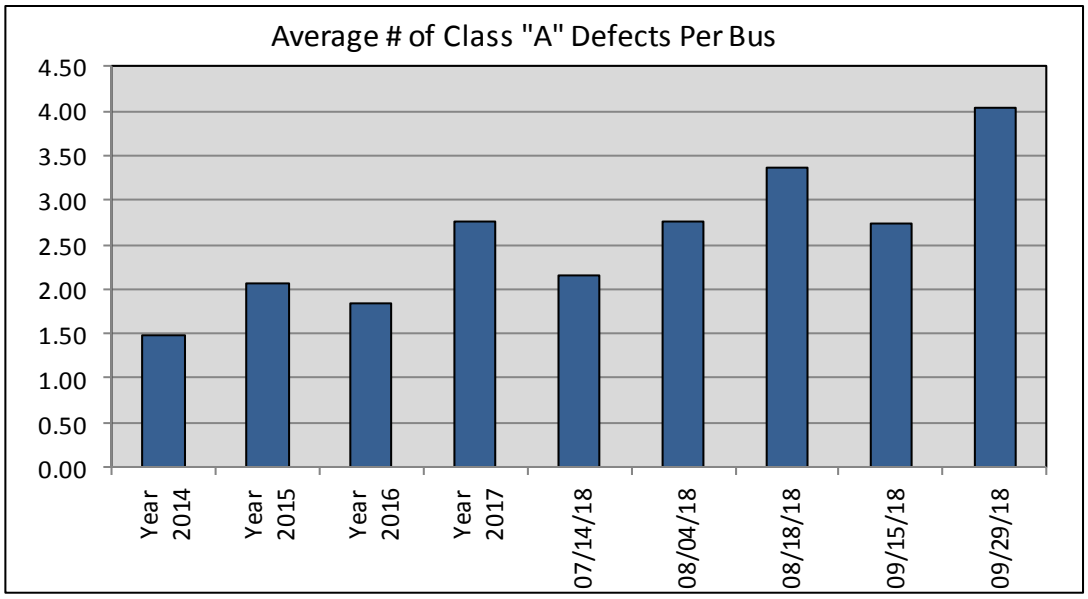
One hundred & twenty-five (125) Class "A" safety-related defects were found during this inspection, for an average of 4.03 Class "A" safety-related defects per bus. The 125 Class "A" defects found during this current audit are listed in Table 5 which follows.

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62617	2011	Gillig	Oil leak, engine compartment, vent tube leaking above oil pressure switch
62617	2011	Gillig	Brakes, rear, out of adjustment
62618	2012	Gillig	Radius rod, C/S rear upper, worn
62618	2012	Gillig	Tire, C/S rear inner, worn
62622	2011	Gillig	Alternator belt, engine compartment, cracked
62622	2011	Gillig	Radius rods, both rear upper, worn
62622	2011	Gillig	Coolant line bracket, engine compartment, both bolts broken in transmission
62627	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62627	2011	Gillig	Radius rods, both rear upper, worn
62630	2011	Gillig	A/C belt, engine compartment, cracked
62630	2011	Gillig	Alternator belt, engine compartment, cracked
62630	2011	Gillig	Water pump belt, engine compartment, cracked
62630	2011	Gillig	Oil leak, engine compartment, rear main seal leaking
62630	2011	Gillig	Oil leak, engine compartment, oil filler tube leaking at block
62634	2011	Gillig	Water pump belt, engine compartment, cracked
62634	2011	Gillig	Alternator belt, engine compartment, cracked
62634	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62634	2011	Gillig	Oil leak, engine compartment, steering pump leaking
62634	2011	Gillig	Coolant leak, engine compartment, water pump leaking
62634	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62634	2011	Gillig	Oil leak, engine compartment, alternator seal leaking
62635	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62635	2011	Gillig	Oil leak, engine compartment, pan drain plug leaking
62636	2011	Gillig	Radius rod, C/S rear upper, worn
62636	2011	Gillig	Oil leak, engine compartment, turbo return line leaking
62636	2011	Gillig	Oil leak, engine compartment, dip stick tube leaking
62638	2011	Gillig	A/C belt, engine compartment, cracked
62638	2011	Gillig	Alternator belt, engine compartment, cracked
62638	2011	Gillig	Oil leak, transmission, oil pan leaking
62638	2011	Gillig	Oil leak, steering, hydraulic reservoir leaking
62638	2011	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
62638	2011	Gillig	Oil leak, engine compartment, rear main seal leaking
62638	2011	Gillig	Radius rods, both rear lower, worn
62639	2012	Gillig	Radius rods, both rear lower, worn
62639	2012	Gillig	Oil leak, engine compartment, oil filler tube leaking at block
62639	2012	Gillig	Oil leak, transmission, oil pan leaking
62639	2012	Gillig	Oil leak, transmission, dip stick tube leaking
62639	2012	Gillig	Windshield, S/S, cracked
62645	2012	Gillig	Windshield, S/S, BB hole
62645	2012	Gillig	Radius rods, both rear lower, worn
62645	2012	Gillig	Oil leak, engine compartment, plastic tube above oil pressure switch leaking
62647	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62647	2012	Gillig	Radius rods, C/S rear lower, worn
62647	2012	Gillig	A/C belt, engine compartment, cracked
62647	2012	Gillig	Alternator belt, engine compartment, cracked

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62648	2012	Gillig	Radius rod, S/S rear lower, worn
62648	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62651	2012	Gillig	Oil leak, engine compartment, dip stick tube leaking
62651	2012	Gillig	Oil leak, engine compartment, oil filler tube leaking
62652	2012	Gillig	Radius rods, both rear lower, worn
62652	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62652	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62652	2012	Gillig	Oil leak, engine compartment, alternator body leaking
63140	2007	Gillig	Oil leak, engine compartment, alternator leaking at both ends
63140	2007	Gillig	Radius rod, C/S rear upper, worn
63140	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63143	2007	Gillig	Water pump belt, engine compartment, noisy bearing noise
63143	2007	Gillig	Courtesy lights, by #3 & #4 doors, inop
63143	2007	Gillig	Oil leak, front, gear box leaking
63143	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63148	2007	Gillig	W/C lift safety strip, rear, inop
63148	2007	Gillig	Sway bar bushings, front, worn
63148	2007	Gillig	Alternator belt, engine compartment, cracked
63148	2007	Gillig	Radius rods, both rear lower, worn
63148	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63148	2007	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63163	2008	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63163	2008	Gillig	Oil leak, engine compartment, oil filler tube leaking
63163	2008	Gillig	Oil leak, engine compartment, timing chain cover leaking
63168	2008	Gillig	King pins, both, worn
63168	2008	Gillig	Oil leak, engine compartment, pan drain plug leaking
63168	2008	Gillig	Coolant leak, engine compartment, coolant line above air compressor leaking
63168	2008	Gillig	Dome lamps, S/S #1 & #2, inop
63197	2010	Gillig	A/C belt, engine compartment, cracked
63197	2010	Gillig	Flooring, forward of hatch, coming up (trip hazard)
63197	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63197	2010	Gillig	Oil leak, engine compartment, hydraulic fan leaking
63197	2010	Gillig	Radius rod, S/S rear lower, worn
63199	2010	Gillig	W/C ramp, front, very slow
63199	2010	Gillig	King pins, both, worn
63199	2010	Gillig	Tire, S/S rear inner, worn
63199	2010	Gillig	Radius rods, both rear lower, worn
63199	2010	Gillig	Oil leak, transmission, pan drain plug leaking
63199	2010	Gillig	Oil leak, air system, oil leak between air compressor & hydraulic pump
63199	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63202	2010	Gillig	Brake chamber, S/S rear, hanging up / won't release
63202	2010	Gillig	Drag link, at pitman arm, worn
63202	2010	Gillig	Coolant pipe bracket, engine compartment, broken
63202	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
			dirty)
63202	2010	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63202	2010	Gillig	Dome lamp, S/S #1, inop
63202	2010	Gillig	Oil leak, engine compartment, alternator end plate gasket leaking
63204	2010	Gillig	Radius rods, both rear, worn
63204	2010	Gillig	Oil leak, engine compartment, oil pan gasket & drain plug leaking
63204	2010	Gillig	Oil leak, engine compartment dip stick tube leaking
63204	2010	Gillig	Oil leak, engine compartment, oil cooler leaking
63205	2010	Gillig	Oil leak, engine compartment, alternator seal & end plate gasket leaking
63205	2010	Gillig	Oil leak, engine compartment, timing chain cover leaking
63205	2010	Gillig	Oil leak, engine compartment, oil cooler leaking
63205	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63205	2010	Gillig	Oil leak, engine compartment, dip stick tube leaking
63206	2010	Gillig	Oil leak, front, gear box leaking
63206	2010	Gillig	Alternator belt, engine compartment, cracked
63206	2010	Gillig	Water pump belt, engine compartment, cracked
63206	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63209	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63209	2010	Gillig	Oil leak, engine compartment, alternator body leaking
63210	2010	Gillig	Bell cord, S/S rear, broken
63210	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63210	2010	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63210	2010	Gillig	Drag link, at pitman arm, worn
63210	2010	Gillig	Oil leak, engine compartment, alternator end plate leaking
63210	2010	Gillig	Chamber hoses, rear, rubbing / chaffing against each other
63211	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63211	2010	Gillig	Oil leak, engine compartment, cylinder head leaking
63211	2010	Gillig	Oil leak, engine compartment, alternator seal leaking
63211	2010	Gillig	Drag link, at pitman arm, worn
63211	2010	Gillig	Radius rods, both rear lower, worn
63211	2010	Gillig	Hydraulic line, @ pump, robbing
63211	2010	Gillig	Coolant pipe bracket, engine compartment, bolt broken
63214	2010	Gillig	Fuel leak, engine compartment, top of engine leaking
63214	2010	Gillig	Radius rods, both rear lower, worn
63214	2010	Gillig	Oil leak, engine compartment, oil cooler leaking
63214	2010	Gillig	Drag link, at pitman arm, worn
63214	2010	Gillig	Dome lamp, C/S #5, inop

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 4.03 average Class "A" defects per bus found during this current inspection is higher than at any time since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The number of safety-critical defects is increasing, exposing the County and its riders to unnecessary risk.**



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-one (31) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

SUMMARY OF RECOMMENDATIONS

One hundred & twenty-five (125) Class "A" safety-related defects were found during this current audit, or 4.03 average Class "A" defects per bus. **Overall, the fleet is deteriorating and placing the County at increased risk for vehicle fires and accidents**. The number of Class "A" defects per bus found in the audit is the highest

since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC recommends that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class A defects in this category was 28 during this current audit compared to 19 last audit. This could be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of fifty one (51) engine compartment oil leak defects compared to forty (40) engine compartment oil leak defects last audit, two (2) coolant leak defects compared to one (1) coolant leak defect last audit, and one (1) fuel leak defect this audit.

- TRC recommends a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Thirty-three (33) Buses

Conducted September 15 - 17, 2018

September 19, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-three (33) Buses
Conducted September 15 - 17, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-three (33) Buses
Conducted September 15 - 17, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on September 15 - 17, 2018 by TRC for Prince George's County. Forty-three (43) buses were scheduled for a fleet inspection and maintenance record review; however, ten (10) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62644/engine, Bus 63090/retired, Bus 63092/wheelchair lift, Bus 63142/engine, Bus 63168/at vendor, Bus 63170/retired, Bus 63194/accident, Bus 63208/at vendor, and Bus 63215/transmission.

- The results of this current audit are as follows:

Total Defects	105
Average Defects per Bus	3.18
Total Class "A" Safety-Related Defects	90
Average Class "A" Safety-Related Defects per Bus	2.73

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, August 18 – 20, 2018, and September 15 – 17, 2018 audit results. Results show a continued increase in Class "A" defects over the long-term average.

- The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected.

- Positive observations from this audit include the following:
    - Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
    - PMI records were well organized and easy to locate;
    - All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-three (33) buses received a physical inspection during this audit. Table 1 below identifies these 33 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62620	2011	Gillig
62621	2011	Gillig
62625	2011	Gillig
62626	2011	Gillig
62629	2011	Gillig
62632	2011	Gillig
62633	2011	Gillig
62637	2011	Gillig
62640	2012	Gillig
61642	2012	Gillig
62643	2012	Gillig
62646	2012	Gillig
62650	2012	Gillig
63149	2007	Gillig
63151	2007	Gillig
63160	2008	Gillig
63161	2008	Gillig
63162	2008	Gillig
63164	2008	Gillig
63165	2008	Gillig
63166	2008	Gillig
63167	2008	Gillig
63169	2008	Gillig
63190	2009	Gillig
63193	2009	Gillig
63198	2010	Gillig
63201	2010	Gillig
63203	2010	Gillig
63207	2010	Gillig
63212	2010	Gillig
63213	2010	Gillig
63216	2010	Gillig
63217	2010	Gillig

Table 2 below identifies the ten buses that were not available for inspection.

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62624	2011	Gillig	Accident
62644	2012	Gillig	Engine
63090	2006	Gillig	Retired
63092	2006	Gillig	Wheelchair Lift
63142	2007	Gillig	Engine
63168	2008	Gillig	At Vendor
63170	2008	Gillig	Retired
63194	2009	Gillig	Accident
63208	2010	Gillig	At Vendor
63215	2010	Gillig	Transmission

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls

14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-three (33) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-three (33) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

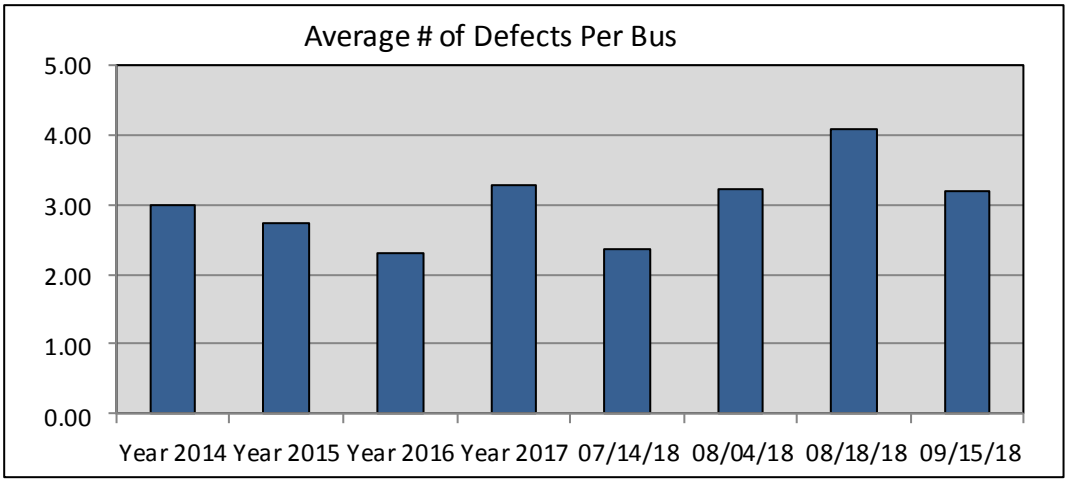
Overall Fleet Condition

One hundred & five (105) defects were found during this current audit, or 3.18 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, August 18 – 20, 2018, and September 15 – 17, 2018 audit results. The table also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, August 18 – 2018, and September 15 – 17, 2018 audit results.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14–16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75
Aug. 18–20, 2018	98	4.08	81	3.38
Sept. 15-17, 2018	105	3.18	90	2.73

As can be seen from Table 3 above and the chart below, the 3.18 average defects per bus found during this current inspection is down when compared to the average defects per bus found during the August 18 – 20, 2018 audit, the August 4 – 6, 2018 audit, and the average defects per bus for Year 2017, however, is up when compared to the average defects per bus found during the July 14 – 16, 2018 audit and the audit average defects per bus for Year 2014, Year 2015, and Year 2016.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment category, once again, showed the most defects during this audit, with a total of 50 defects compared to 29 Engine Compartment defects last audit, followed by the Suspension/Steering category with a total of 19 defects compared to 26 Suspension/Steering defects last audit.

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, and August 18 – 20, 2018 audit results. Critical areas of concern are highlighted in Table 4 below.

Table 4

Summary of Defects by Category	Year 2014 Average	Year 2015 Average	Year 2016 Average	Year 2017 Average	7/14/18	8/04/18	8/18/18	9/15/18
Accessibility Features	7	2	3	3	3	4	3	3
Air System/Brake System	15	8	7	7	2	3	7	8
Climate Control	2	0	0	1	0	0	0	0
Destination Signs	1	0	0	0	0	0	0	0
Differential	1	1	1	1	1	0	0	0
Driver's Controls	5	2	1	2	0	2	0	1
Electrical System	2	1	1	1	1	0	1	0
Engine Compartment	36	27	24	34	18	34	29	50
Exhaust	0	0	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8	18	18	14
Interior Condition	13	13	4	10	2	1	2	3
Lights	7	6	5	6	2	3	10	1
Passenger Controls	1	1	1	2	0	2	2	0
Safety Equipment	7	4	1	1	0	0	0	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0	0	0
Suspension/Steering	10	10	10	19	21	28	26	19
Tires	3	1	3	2	1	4	0	3
Transmission	2	2	2	1	0	4	0	3
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**	**98**	**105**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**	**4.08**	**3.18**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Ninety (90) Class "A" safety-related defects were found during this inspection, for an average of 2.73 Class "A" safety-related defects per bus. The ninety (90) Class "A" defects found during this current audit are listed in Table 5 below.

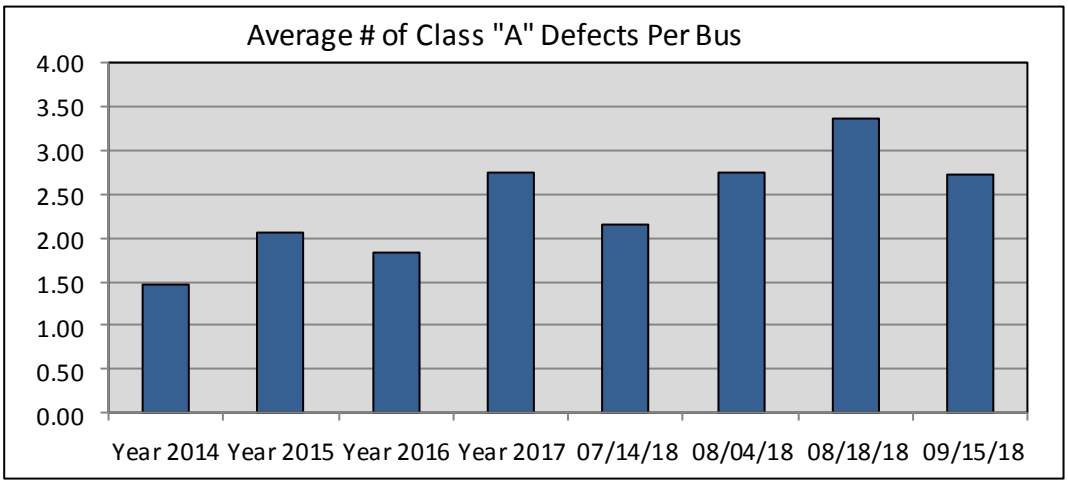
Table 5

Bus #	Year	Make	Class "A" Defects
62620	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62620	2011	Gillig	Windshield, S/S, cracked
62621	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks / engine dirty
62625	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62625	2011	Gillig	Oil leak, engine compartment, timing chain cover leaking
62625	2011	Gillig	Dome light, C/S #1, inop
62626	2011	Gillig	A/C belt, engine compartment, cracked
62626	2011	Gillig	Water pump belt, engine compartment, damaged

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62629	2011	Gillig	Windshield, S/S, BB hole
62632	2011	Gillig	All belts, engine compartment, cracked
62633	2011	Gillig	Air tanks, bottom, full of oil
62633	2011	Gillig	Radius rods, both rear lower, worn
62633	2011	Gillig	Oil leak, engine compartment, oil filler tube leaking at block
62637	2011	Gillig	Oil leak, engine compartment, oil filter leaking
62637	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62637	2011	Gillig	Oil leak, engine compartment, oil leak between air compressor & steering pump
62640	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62640	2012	Gillig	Oil leak, engine compartment, oil pressure switch leaking
62640	2012	Gillig	Oil leak, engine compartment, timing chain cover leaking
62640	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62640	2012	Gillig	Brakes, both front, knocking noise when applying brakes (possible flat spot of roller (replaced by mechanic)
61642	2012	Gillig	Alternator belt, engine compartment, cracked
61642	2012	Gillig	Water pump belt, engine compartment, damaged
61642	2012	Gillig	Oil leak, engine compartment, alternator seals leaking
61642	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
61642	2012	Gillig	Radius rods, C/S rear lower, worn
62643	2012	Gillig	Radius rods, both rear lower, worn
62646	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62646	2012	Gillig	Flooring, around floor hatch, coming up / trip hazard
62646	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62646	2012	Gillig	Oil leak, engine compartment, oil leak between A/C compressor & hydraulic pump leaking
62650	2012	Gillig	Oil leak, air system, air compressor mounting gasket leaking
62650	2012	Gillig	Oil leak, transmission, oil lines leaking @ oil pan
63149	2007	Gillig	Windshield, S/S, BB hole
63151	2007	Gillig	Oil leak, front, gear box leaking
63151	2007	Gillig	Wheelchair lift, front, inop
63151	2007	Gillig	Coolant leak, @ engine block, coolant pipe hose leaking
63160	2008	Gillig	Radius rod, S/S rear lower, worn
63160	2008	Gillig	Oil leak, engine compartment, hydraulic fan solenoid valve line leaking
63160	2008	Gillig	Brake chamber, C/S rear, hanging at times / won't release
63161	2008	Gillig	Alternator belt, engine compartment, cracked
63161	2008	Gillig	Air tanks, all, full of water
63161	2008	Gillig	Oil leak, engine compartment, oil filler tube leaking
63161	2008	Gillig	Oil leak, engine compartment, oil cooler leaking
63161	2008	Gillig	Oil leak, engine compartment, oil leak above air compressor
63162	2008	Gillig	Radius rods, both rear lower, worn
63162	2008	Gillig	Tire, S/S rear inner, worn
63162	2008	Gillig	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63162	2008	Gillig	Windshield washer, driver's controls, inop
63164	2008	Gillig	Radius rod, S/S rear lower, worn
63164	2008	Gillig	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63165	2008	Gillig	Air tanks, all, full of water

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63165	2008	Gillig	Air leak, rear, relay valve leaking when brakes applied
63165	2008	Gillig	Radius rods, both rear lower, worn
63165	2008	Gillig	Wheelchair ramp, front, operates very slowly
63165	2008	Gillig	Wheelchair ramp, front, won't sit flush with floor / trip hazard
63166	2008	Gillig	A/C belt, engine compartment, cracked
63169	2008	Gillig	Oil leak, engine compartment, hydraulic fan line leaking
63169	2008	Gillig	Oil leak, engine compartment, C/S seal leaking
63169	2008	Gillig	Oil leak, engine compartment, rear main seal leaking
63169	2008	Gillig	Air dryer, bottom, inop
63190	2009	Gillig	Radius rods, both rear lower, worn
63190	2009	Gillig	Drag link, at pitman arm, worn
63193	2009	Gillig	Tire, C/S rear inner, worn
63193	2009	Gillig	Tire, S/S rear outer, worn
63193	2009	Gillig	Radius rod, C/S rear upper, worn
63193	2009	Gillig	Radius rod, S/S rear lower, worn
63198	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63198	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63198	2010	Gillig	Oil leak, engine compartment, oil leak at hydraulic line pump
63201	2010	Gillig	A/C belt, engine compartment, cracked
63201	2010	Gillig	Drag link, at pitman arm, worn
63201	2010	Gillig	Radius rod, S/S rear lower, worn
63201	2010	Gillig	Oil leak, transmission, leaking from top
63203	2010	Gillig	Belts, engine compartment, all belts cracked
63207	2010	Gillig	A/C belt, engine compartment, cracked
63207	2010	Gillig	Drag link, at pitman arm, worn
63207	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63207	2010	Gillig	Oil leak, engine compartment, oil pan drain plug leaking
63212	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63212	2010	Gillig	Drag link, at pitman arm, worn
63213	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63213	2010	Gillig	Oil leak, engine compartment, oil filler tube leaking @ block
63213	2010	Gillig	Radius rods, all rear lower, worn
63216	2010	Gillig	Radius rods, both rear lower, worn
63216	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63216	2010	Gillig	Oil leak, engine compartment, timing chain cover leaking
63216	2010	Gillig	Oil leak, engine compartment, oil filer tube leaking @ block
63217	2010	Gillig	Radius rods, both rear lower, worn
63217	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 90 Class "A" defects found during this current inspection is down when compared to the August 18 – 20, 2018 audit, the August 4 – 6, 2018 audit, and the average Class "A" defects per bus for Year 2017, however, is up when compared to the July 14 – 16, 2018 audit and the average Class "A" defects per bus for Year 2014, Year 2015, and Year 2016.



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-three (33) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts.

SUMMARY OF RECOMMENDATIONS

- Ninety (90) Class "A" safety-related defects were found during this current audit, or 2.73 average Class "A" defects per bus, compared to 3.38 average Class "A" defects per bus the previous audit. TRC continues to recommend that Prince George's County work with Transdev to come up with a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC recommends that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class A defects in this category was 19 and may be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of forty (40) engine compartment oil leak defects and one (1) coolant leak defect.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Thirty-four (34) Buses

Conducted October 13 - 15, 2018

October 17, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-four (34) Buses
Conducted October 13 – 15, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-four (34) Buses
Conducted October 13 – 15, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on October 13 - 15, 2018 by TRC for Prince George's County. Forty-three (43) buses were scheduled for a fleet inspection and maintenance record review; however, nine (9) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62628/transmission, Bus 62644/engine, Bus 63092/air conditioning & wheelchair, Bus 63168/air compressor, Bus 63189/accident, Bus 63194/accident, Bus 63198/rear main seal leak, and Bus 63215/transmission. The number of buses not available for inspection has been increasing the past several audits and is cause for concern.

The results of this current audit are as follows:

Total Defects	129
Average Defects per Bus	3.79
Total Class "A" Safety-Related Defects	120
Average Class "A" Safety-Related Defects per Bus	3.53

The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the audit results for all audits conducted to date in Year 2018. Results show a continued increase in Class "A" defects over the long-term average. Note that nearly all defects found were Class A defects.

Engine compartment defects and Steering/Suspension defects continue to increase with no observable plan for improvement.

The condition of the fleet is deteriorating and poses unnecessary risk to the County and its riders. TRC recommends immediate corrective action.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-four (34) buses received a physical inspection during this audit. Table 1 below identifies these 34 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62617	2011	Gillig
62619	2011	Gillig
62623	2012	Gillig
62633	2011	Gillig
62641	2012	Gillig
62642	2012	Gillig
62646	2012	Gillig
62649	2012	Gillig
62650	2012	Gillig
62652	2012	Gillig
63139	2007	Gillig
63141	2007	Gillig
63142	2007	Gillig
63144	2007	Gillig
63145	2007	Gillig
63146	2007	Gillig
63147	2007	Gillig
63148	2007	Gillig
63150	2007	Gillig
63159	2008	Gillig
63160	2008	Gillig
63161	2008	Gillig
63188	2009	Gillig
63191	2009	Gillig
63192	2010	Gillig
63195	2009	Gillig
63196	2010	Gillig
63200	2010	Gillig
63204	2010	Gillig
63208	2010	Gillig
63210	2010	Gillig
63211	2010	Gillig
63212	2010	Gillig
63217	2010	Gillig

Table 2 which follows identifies the nine buses that were not available for inspection. *The number of buses not available for inspection has been increasing the past few audits and is cause for concern.*

Table 2 Buses Not Available for Inspection			
BUSES NOT INSPECTED	**MODEL YEAR**	**VEHICLE MAKE**	**REASON**
62624	2011	Gillig	Accident
62628	2011	Gillig	Transmission
62644	2012	Gillig	Engine
63092	2006	Gillig	A/C & wheelchair
63168	2008	Gillig	Air compressor
63189	2009	Gillig	Accident
63194	2009	Gillig	Accident
63198	2010	Gillig	Rear main seal leak
63215	2010	Gillig	Transmission

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-four (34) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-four (34) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

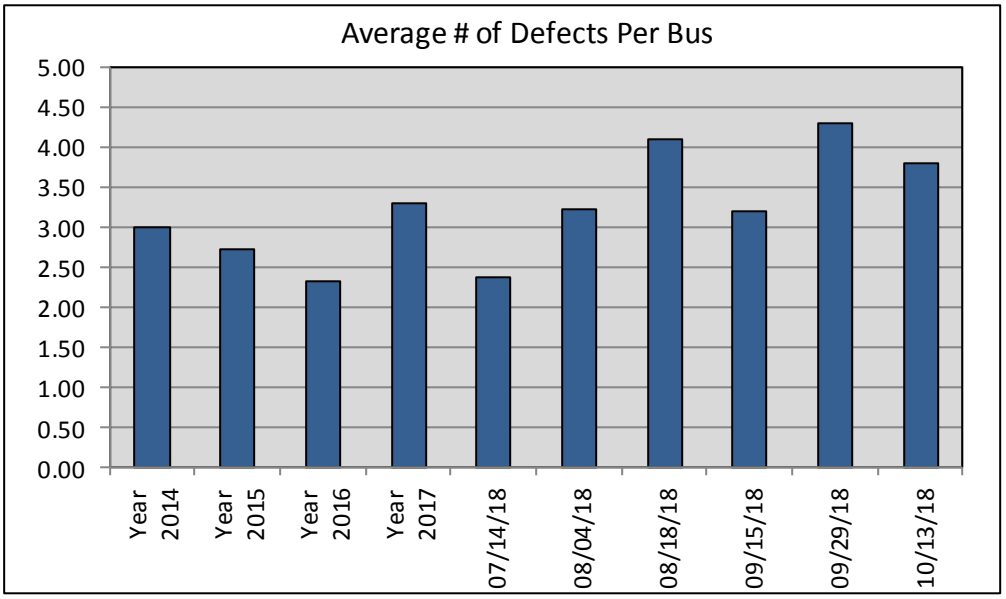
Overall Fleet Condition

One hundred & twenty-nine (129) defects were found during this current audit, or 3.79 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Table 3 also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14–16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75
Aug. 18–20, 2018	98	4.08	81	3.38
Sept. 15-17, 2018	105	3.18	90	2.73
Sept. 29–Oct. 1, 2018	133	4.29	125	4.03
Oct. 13 – 15, 2018	**129**	**3.79**	**120**	**3.53**

As can be seen from Table 3 above and the chart below, when compared to past audits, the 3.79 average defects per bus found during this current inspection is the third highest average defects per bus since TRC first began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The condition of the fleet is rapidly deteriorating, exposing the County to unnecessary risk.**



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Differential, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Suspension/Steering, Tires, and Transmission categories. Once again, the Engine Compartment category and the Suspension/Steering category comprised nearly three-quarters of all defects (68%). Engine compartment defects decreased slightly with a total of 60 defects compared to 69 defects last audit, and the number of Suspension/Steering category defects remained the same when compared to the 28 defects experienced during the last audit. **Engine Compartment defects represent a critical fire risk, and steering/suspension defects represent a critical accident risk. TRC recommends immediate corrective action to reduce defects in these categories.**

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the audit results for all audits conducted to date in Year 2018. Critical areas of concern are highlighted in Table 4 below.

Table 4

Summary of Defects by Category	Year 2014 Avg	Year 2015 Avg	Year 2016 Avg	Year 2017 Avg	7/14/18	8/04/18	8/18/18	9/15/18	10/1/18	10/1318
Accessibility Features	7	2	3	3	3	4	3	3	2	2
Air System/Brake System	15	8	7	7	2	3	7	8	4	7
Climate Control	2	0	0	1	0	0	0	0	0	0
Destination Signs	1	0	0	0	0	0	0	0	0	0
Differential	1	1	1	1	1	0	0	0	0	1
Driver's Controls	5	2	1	2	0	2	0	1	0	0
Electrical System	2	1	1	1	1	0	1	0	0	0
Engine Compartment	36	27	24	34	18	34	29	50	69	60
Exhaust	0	0	0	0	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8	18	18	14	9	11
Interior Condition	13	13	4	10	2	1	2	3	2	2
Lights	7	6	5	6	2	3	10	1	4	8
Passenger Controls	1	1	1	2	0	2	2	0	1	4
Safety Equipment	7	4	1	1	0	0	0	0	0	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0	0	0	0	0
Suspension/Steering	10	10	10	19	21	28	26	19	28	28
Tires	3	1	3	2	1	4	0	3	2	4
Transmission	2	2	2	1	0	4	0	3	12	2
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**	**98**	**105**	**133**	**129**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**	**4.08**	**3.18**	**4.29**	**3.79**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are*

not actually capturing defects. A review of inspector's qualifications and training is recommended.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

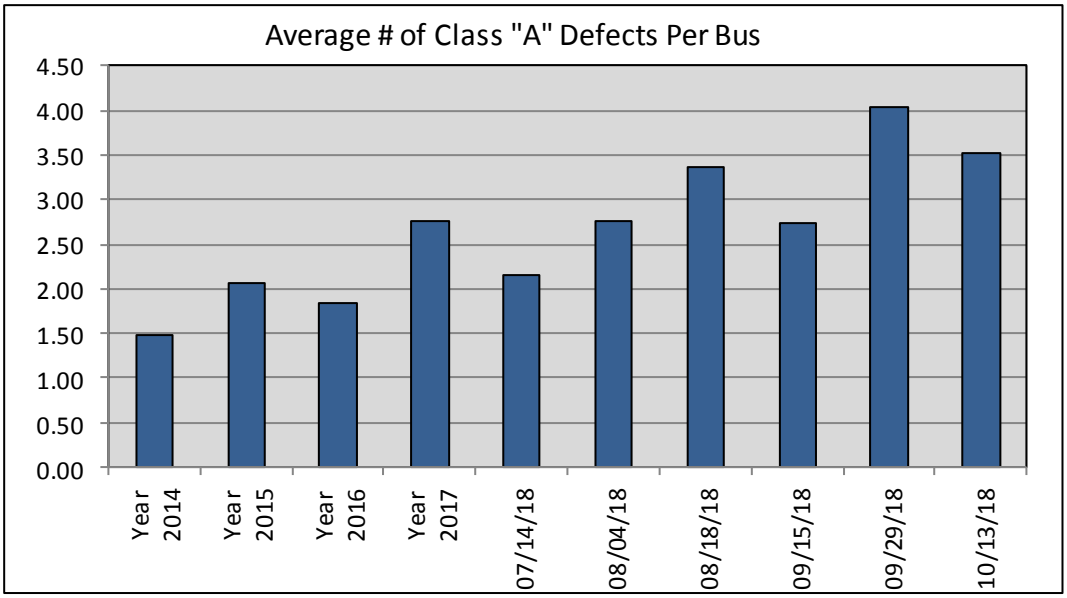
One hundred twenty (120) Class "A" safety-related defects were found during this inspection, for an average of 3.53 Class "A" safety-related defects per bus. The 120 Class "A" defects found during this current audit are listed in Table 5 which follows.

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62617	2011	Gillig	Radius rods, rear upper, both worn
62617	2011	Gillig	Coolant leak, engine compartment, air compressor coolant hose leaking (secured by mechanic)
62619	2011	Gillig	Oil leak, engine compartment, rear main seal leaking
62619	2011	Gillig	Oil leak, engine compartment, oil pan damaged & leaking
62623	2012	Gillig	A/C belt, engine compartment, cracked
62623	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62623	2012	Gillig	Oil leak, engine compartment, air compressor gasket leaking
62623	2012	Gillig	Air tank, engine compartment, sludge build up
62623	2012	Gillig	Flooring, on floor hatch & around hatch, coming up / trip hazard
62623	2012	Gillig	King pin, S/S, worn
62633	2011	Gillig	Oil leak, engine compartment, alternator end plate gasket leaking
62633	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62633	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62641	2012	Gillig	Oil leak, engine compartment, alternator end plate leaking
62641	2012	Gillig	A/C belt, engine compartment, cracked
62641	2012	Gillig	Alternator belt, engine compartment, cracked
62641	2012	Gillig	Oil leak, engine compartment, gear box leaking
62641	2012	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
62641	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62641	2012	Gillig	Oil leak, engine compartment, timing chain cover leaking
62642	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62646	2012	Gillig	Alternator belt, engine compartment, cracked
62646	2012	Gillig	King pin, S/S, worn
62646	2012	Gillig	Radius rods, both rear lower, worn
62646	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62646	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62646	2012	Gillig	Oil leak, engine compartment, air compressor gasket in between hydraulic pump leaking
62649	2012	Gillig	Alternator belt, engine compartment, cracked
62650	2012	Gillig	Radius rods, both rear lower, worn
62650	2012	Gillig	Tire, S/S rear inner, worn
62650	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62652	2012	Gillig	Oil leak, engine compartment, oil pressure switch leaking
62652	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62652	2012	Gillig	Radius rods, both rear lower, worn
62652	2012	Gillig	Radius rod, S/S rear upper, worn
63139	2007	Gillig	Radius rods, S/S upper & lower front, worn
63139	2007	Gillig	Oil leak, engine compartment, hydraulic fan line leaking
63139	2007	Gillig	Oil leak, engine compartment, alternator seal leaking
63141	2007	Gillig	Oil leak, engine compartment, alternator seal leaking
63141	2007	Gillig	A/C belt, engine compartment, cracked
63141	2007	Gillig	Radius rods, both front lower, worn
63141	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63141	2007	Gillig	Tire, C/S rear outer, flat (replaced by mechanic)

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63142	2007	Gillig	Tire, S/S front, worn (replaced by mechanic)
63142	2007	Gillig	Radius rods, all front, worn
63142	2007	Gillig	Radius rods, both lower rear, worn
63142	2007	Gillig	Coolant leak, S/S of engine, coolant leak
63144	2007	Gillig	Wheelchair lift safety strips, both, inop
63144	2007	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63145	2007	Gillig	Radius rod, C/S front lower, worn
63145	2007	Gillig	Oil leak, front, gear box leaking
63145	2007	Gillig	Stop requests, all, inop
63145	2007	Gillig	Dome lamps, C/S #1 - #2 & S/S #1 - #2, inop
63146	2007	Gillig	Oil leak, engine comp0artment, hydraulic fan motor leaking
63147	2007	Gillig	Dome lamps, C/S #2 & S/S #2, inop
63147	2007	Gillig	Coolant leak, engine compartment, circulating pump leaking
63147	2007	Gillig	Radius rods, S/S rear lower, worn
63147	2007	Gillig	Radius rods, C/S rear upper, worn
63148	2007	Gillig	Wheelchair lift restraint, front, won't go down (repaired by mechanic)
63148	2007	Gillig	Oil leak, engine compartment, oil leaking between air compressor & hydraulic pump
63150	2007	Gillig	A/C belt, engine compartment, cracked
63150	2007	Gillig	Dome lamps, S/S #3, #4 & #5, inop
63150	2007	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63159	2008	Gillig	Dome lamp, C/S #5, inop
63159	2008	Gillig	Passenger signal cord, both sides, broken
63159	2008	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63160	2008	Gillig	Oil leak, engine compartment, hydraulic fan relay leaking
63160	2008	Gillig	Radius rods, S/S rear lower, worn
63161	2008	Gillig	Alternator belt, engine compartment, cracked
63161	2008	Gillig	Oil leak, engine compartment, alternator leaking @ both ends
63161	2008	Gillig	Oil leak, engine compartment, A/C compressor leaking
63161	2008	Gillig	Air leak, S/S front, air bag leaking
63161	2008	Gillig	Radius rod, S/S rear lower, worn
63161	2008	Gillig	Oil leak, engine compartment, oil cooler leaking
63161	2008	Gillig	Oil leak, engine compartment, oil filler tube leaking
63161	2008	Gillig	Air tank, all, full of water / check air dryer
63188	2009	Gillig	Passenger signal cord, C/S, broken
63188	2009	Gillig	Drag link, @ pitman arm, worn
63188	2009	Gillig	Radius rods, both rear lower, worn
63188	2009	Gillig	Oil leak, engine compartment, oil cooler leaking
63188	2009	Gillig	Oil leak, engine compartment, oil filter leaking
63191	2009	Gillig	Oil leak, engine compartment, alternator end plate gasket leaking
63191	2009	Gillig	King pins, both, worn
63191	2009	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63191	2009	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63192	2010	Gillig	Air tanks, all, full of water

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63195	2009	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63195	2009	Gillig	Dome lamp, C/S #3, inop (repaired by mechanic)
63196	2010	Gillig	Drag link, @ pitman arm, worn
63196	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63200	2010	Gillig	A/C belt, engine compartment, cracked
63200	2010	Gillig	Flooring, around hatch, coming up / trip hazard
63200	2010	Gillig	Windshield, S/S, chipped
63200	2010	Gillig	Radius rods, both rear lower, worn
63200	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63204	2010	Gillig	Radius rods, both rear lower, worn
63204	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63204	2010	Gillig	Dome lamp, C/S #3, inop
63208	2010	Gillig	Radius rods, both front lower, worn
63208	2010	Gillig	Radius rods, both rear lower, worn
63208	2010	Gillig	Oil leak, rear, gasket leaking
63208	2010	Gillig	Touch tape, S/S flip-up seat, inop
63210	2010	Gillig	A/C belt, engine compartment, cracked
63210	2010	Gillig	Oil leak, engine compartment, alternator leaking @ both ends
63210	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63210	2010	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63211	2010	Gillig	Oil leak, engine compartment, timing chain cover leaking
63211	2010	Gillig	Oil leak, engine compartment, valve cover leaking (bottom of engine full of oil)
63211	2010	Gillig	ABS light, dashboard, on steady
63211	2010	Gillig	Dome lamp, C/S #4, inop
63211	2010	Gillig	Windshield, S/S, cracked
63212	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63212	2010	Gillig	Tires, S/S rear, worn
63217	2010	Gillig	Oil leak, front engine compartment, alternator seal leaking
63217	2010	Gillig	Radis rods, both rear lower, worn
63217	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63217	2010	Gillig	King pins, broth front, worn
63217	2010	Gillig	Coolant leak, engine compartment @ block, coolant pipe hose leaking
63188	2009	Gillig	Oil leak, engine compartment, rear main seal leaking
63192	2010	Gillig	Dome lamp, S/S #5, intermittent

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 3.53 average Class "A" defects per bus found during this current inspection is the second highest average Class "A" defects per bus experienced since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014. **The number of safety-critical defects is increasing, exposing the County and its riders to unnecessary risk.**



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-four (34) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

SUMMARY OF RECOMMENDATIONS

One hundred & twenty (120) Class "A" safety-related defects were found during this current audit, or 3.53 average Class "A" defects per bus compared to 125, or 4.03 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus found during this current audit is the second highest since TRC began conducting bi-monthly vehicle maintenance audits for Prince George's County in 2014, with the highest average number of Class "A" defects being found during the

previous audit (September 29 – October 1, 2018). **Overall, the fleet is deteriorating and placing the County at increased risk for vehicle fires and accidents**.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC recommends that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class "A" defects in this category was 28 during this current audit, unchanged from last audit. This could be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of forty-seven (47) engine compartment oil leak defects compared to 51 engine compartment oil leak defects last audit and two (2) coolant leak defects compared to two coolant leak defects last audit.

- TRC recommends a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Twenty-five (25) Buses

Conducted July 14 - 16, 2018

July 18, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-five (25) Buses
Conducted July 14 – 16, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-five (25) Buses
Conducted July 14 – 16, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. The last inspection was conducted on December 16 -18, 2017 This report presents the findings of the maintenance audit conducted July 14 – 16, 2018 by TRC for Prince George's County. Twenty-nine (29) buses were scheduled for a fleet inspection and maintenance record review; however, four (4) buses were not available for inspection due to the following reasons: Bus 62624/in body shop, Bus 62643/brakes, Bus 63092/would not start, and Bus 63192/transmission.

- The results of this current audit are as follows:

Total Defects	59
Average Defects per Bus	2.36
Total Class "A" Safety-Related Defects	54
Average Class "A" Safety-Related Defects per Bus	2.16

  The Audit Trend Comparison table, which can be found on Page 4, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the July 14 – 16, 2018 audit results.

- The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected.
- Positive observations from this audit include the following:
  - Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
  - PMI records were well organized and easy to locate;
  - Total number of defects decreased from last audit.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Twenty-five (25) buses received a physical inspection during this audit. Table 1 below identifies these 25 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62620	2011	Gillig
62621	2011	Gillig
62625	2011	Gillig
62626	2011	Gillig
62629	2011	Gillig
62632	2011	Gillig
62637	2011	Gillig
62640	2012	Gillig
62641	2012	Gillig
62642	2012	Gillig
62649	2012	Gillig
62650	2012	Gillig
63146	2007	Gillig
63147	2007	Gillig
63151	2007	Gillig
63160	2008	Gillig
63166	2008	Gillig
63167	2008	Gillig
63191	2009	Gillig
63203	2010	Gillig
63207	2010	Gillig
63208	2010	Gillig
63215	2010	Gillig
63216	2010	Gillig
63217	2010	Gillig

Table 2 below identifies the four buses which were not available for inspection.

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE
62624	2011	Gillig
62643	2012	Gillig
63092	2006	Gillig
63192	2010	Gillig

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Alusine Kanu, and Anthony Greenfield. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided

Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-five (25) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-five (25) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

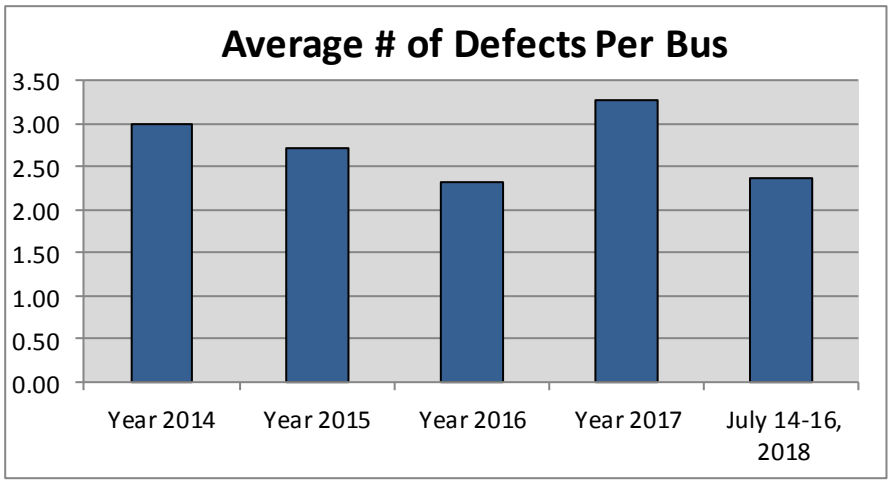
FINDINGS

Overall Fleet Condition

A total of fifty-nine (59) defects were found during this current audit, or 2.36 average defects per bus. The Audit Trend Comparison table below shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018 audit results. The table also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and July 14 – 16, 2018 audit results.

Table 3 Audit Trend Comparison				
Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July14-16,2018	59	2.36	54	2.16

As can be seen from Table 3 above and the chart below, the 2.36 average defects per bus found during this current inspection is lower than Year 2014, Year 2015, and Year 2017 averages, however, is slightly higher than Year 2016 average. Although this result shows an improvement over last year, there is insufficient data to determine if this improvement shows a sustained downward trend. Future results will provide additional data to make this determination.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Differential, Electrical Systems, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, and Tires categories. The Suspension/Steering category showed the most defects with a total of 21 defects, followed by the Engine Compartment category with a total of 18 defects.

Table 4 below compares key performance indicators from this current audit to the audit results for Year 2014, Year 2015, Year 2016, and Year 2017.

Table 4					
Summary of Defects by Category	**Year 2014 Average Per Audit**	**Year 2015 Average Per Audit**	**Year 2016 Average Per Audit**	**Year 2017 Average Per Audit**	**7/14/18**
Accessibility Features	7	2	3	3	3
Air System/Brake System	15	8	7	7	2
Climate Control	2	0	0	1	0
Destination Signs	1	0	0	0	0
Differential	1	1	1	1	1
Driver's Controls	5	2	1	2	0
Electrical System	2	1	1	1	1
Engine Compartment	36	27	24	34	18
Exhaust	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8
Interior Condition	13	13	4	10	2
Lights	7	6	5	6	2
Passenger Controls	1	1	1	2	0
Safety Equipment	7	4	1	1	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0
Suspension/Steering	10	10	10	19	21
Tires	3	1	3	2	1
Transmission	2	2	2	1	0
Total Defects	**126**	**98**	**74**	**105**	**59**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects

- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

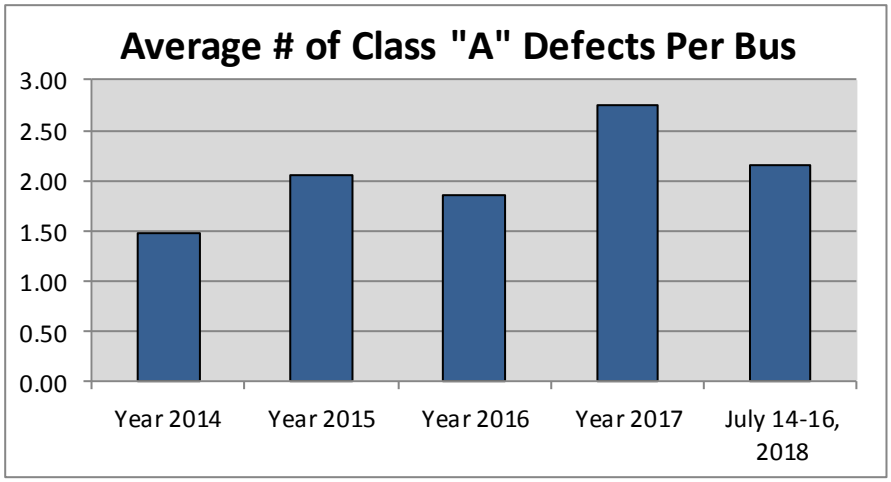
Fifty-four (54) Class "A" safety-related defects were found during this inspection, for an average of 2.16 Class "A" safety-related defects per bus. The fifty-four (54) Class "A" defects found during this current audit are listed in Table 5 which follows.

Table 5

Bus #	Year	Make	Class "A" Defects
62620	2011	Gillig	Radius rods, front, all front radius rods worn
62620	2011	Gillig	Radius rods, rear, all rear radius rods worn
62620	2011	Gillig	Oil leak, S/S engine, oil pan leaking
62620	2011	Gillig	Trailering arm bolt, S/S rear, loose
62621	2011	Gillig	Oil leaks, bottom of engine, multiple oil leaks (engine dirty)
62621	2011	Gillig	Trailering arm bolt, S/S rear, loose
62625	2011	Gillig	Flooring, around floor hatch, torn / trip hazard
62625	2011	Gillig	Radius rods, rear, all rear radius rods worn
62625	2011	Gillig	Oil leaks, bottom of engine, multiple leaks
62626	2011	Gillig	U-joint, differential end, cap worn
62626	2011	Gillig	Radius rods, rear, all rear radius rods worn
62626	2011	Gillig	Slack adjusters, front, both front slack adjusters won't adjust
62629	2011	Gillig	Oil leak, bottom of engine, multiple oil leaks (engine dirty)
62632	2011	Gillig	Drag link, at pitman arm, worn
62632	2011	Gillig	Box cover, engine compartment, missing (replaced by mechanic)
62637	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62640	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62640	2012	Gillig	Oil leak, engine compartment, oil pan leaking
62641	2012	Gillig	Oil leak, engine compartment, oil pan drain plug leaking

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62641	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty / could not locate source)
62642	2012	Gillig	Flooring, around rear floor hatch, torn / trip hazard
62649	2012	Gillig	Coolant leak, engine compartment, water pump leaking
62649	2012	Gillig	Fuel leak, engine compartment, #2 injector leaking (replaced by mechanic)
62650	2012	Gillig	Radius rods, rear, all rear radius rods worn
62650	2012	Gillig	Tire, C/S inner rear, worn
63146	2007	Gillig	Wheelchair lift safety strips, both, inop
63146	2007	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63147	2007	Gillig	Drag link, at pitman arm, worn
63147	2007	Gillig	Courtesy lamps,exterior front by #2 door, both inop
63147	2007	Gillig	Radius rods, rear, all rear radius rods worn
63151	2007	Gillig	Radius rods, rear, all rear radius rods worn
63151	2007	Gillig	Oil leak, at pump, hydraulic line leaking
63151	2007	Gillig	Coolant leak, engine compartment, leaking
63160	2008	Gillig	Wheelchair ramp, front, won't deploy
63160	2008	Gillig	Radius rods, rear, all rear radius rods worn
63166	2008	Gillig	Oil leak, bottom of engine, oil pan dirty (could not locate source)
63166	2008	Gillig	Drag link, at pitman arm, worn
63166	2008	Gillig	Wheelchair seat belt, S/S #1 position, missing
63167	2008	Gillig	Windshield, C/S, 2 BB holes
63167	2008	Gillig	Radius rods, front, all front radius rods worn
63191	2009	Gillig	Air tanks, bottom, full of water / air dryer not working
63191	2009	Gillig	Oil leaks, bottom of engine, multiple leaks (engine dirty / could not locate source)
63191	2009	Gillig	Radius rods, rear lower, worn
63191	2009	Gillig	Dome lamps, both sides, flickering on & off
63207	2010	Gillig	Windshield, C/S, BB hole
63208	2010	Gillig	Radius rods, front, all front radius rods worn
63208	2010	Gillig	Radius rods, rear, all rear radius rods worn
63208	2010	Gillig	Windshield, C/S & S/S, BB holes
63215	2010	Gillig	Radius rods, rear lower, both worn
63215	2010	Gillig	Drag link, at pitman arm, worn
63216	2010	Gillig	Oil leak, engine compartment, crankshaft seal leaking
63216	2010	Gillig	Oil leak, engine compartment, timing cover seal leaking
63217	2010	Gillig	Oil leaks, bottom of engine, multiple leaks (engine dirty / could not locate source)
63217	2010	Gillig	Radius rods, rear lower, worn

As can be seen in the Audit Trend Comparison table on Page 4 and the chart which follows, the 54 Class "A" defects found during this current audit decreased when compared to Year 2017, however, increased compared to Year 2014, Year 2015, and Year 2016.



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the twenty-five (25) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts.

SUMMARY OF RECOMMENDATIONS

- A total of fifty-four (54) Class "A" safety-related defects was found during this audit, or 2.16 average Class "A" defects per bus. The 2.16 average Class "A" defects per bus decreased when compared to Year 2017, however, increased when compared to Year 2014, Year 2015, and Year 2016. TRC continues to recommend that Prince George's County work with Transdev to come up with a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends special attention be placed on inspection and repair of suspension and steering components. The number of Class A defects in this category increased and may be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item.

- TRC continues to recommend that special attention be paid to the flooring defects, including worn, torn, lifting, or cracked flooring. Two (2) flooring defects were found during this audit, both being classified as "A" defects due to being tripping hazards.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Twenty-four (24) Buses

Conducted August 18 - 20, 2018

August 22, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-four (24) Buses
Conducted August 18 - 20, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-four (24) Buses
Conducted August 18 - 20, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on August 18 - 20, 2018 by TRC for Prince George's County. Thirty-three (33) buses were scheduled for a fleet inspection and maintenance record review; however, nine (9) buses were not available for inspection due to the following reasons: Bus 62624/accident, Bus 62633/transmission, Bus 62639/DPF filter, Bus 62644/engine, Bus 63088/retired, Bus 63096/retired, Bus 63142/oil leak, Bus 63169/EGR cooler, and Bus 63194/accident.

- The results of this current audit are as follows:

Total Defects	98
Average Defects per Bus	4.08
Total Class "A" Safety-Related Defects	81
Average Class "A" Safety-Related Defects per Bus	3.38

  The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, and August 18 – 20, 2018 audit results.

- The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected.

- Positive observations from this audit include the following:
  - Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
  - PMI records were well organized and easy to locate;
  - All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Twenty-four (24) buses received a physical inspection during this audit. Table 1 below identifies these 24 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62617	2011	Gillig
62619	2011	Gillig
62623	2012	Gillig
62641	2012	Gillig
62649	2012	Gillig
62652	2012	Gillig
63139	2007	Gillig
63141	2007	Gillig
63144	2007	Gillig
63145	2007	Gillig
63146	2007	Gillig
63147	2007	Gillig
63148	2007	Gillig
63150	2007	Gillig
63159	2008	Gillig
63188	2009	Gillig
63191	2009	Gillig
63192	2010	Gillig
63195	2009	Gillig
63196	2010	Gillig
63200	2010	Gillig
63204	2010	Gillig
63210	2010	Gillig
63211	2010	Gillig

Table 2 below identifies the nine buses which were not available for inspection.

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62624	2011	Gillig	Accident
62633	2011	Gillig	Transmission
62639	2012	Gillig	DPF filter
62644	2012	Gillig	Engine
63088	not provided	Gillig	Retired
63096	not provided	Gillig	Retired
63142	2007	Gillig	Oil leak
63169	2008	Gillig	EGR cooler
63194	2009	Gillig	Accident

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided

Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-four (24) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-four (24) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

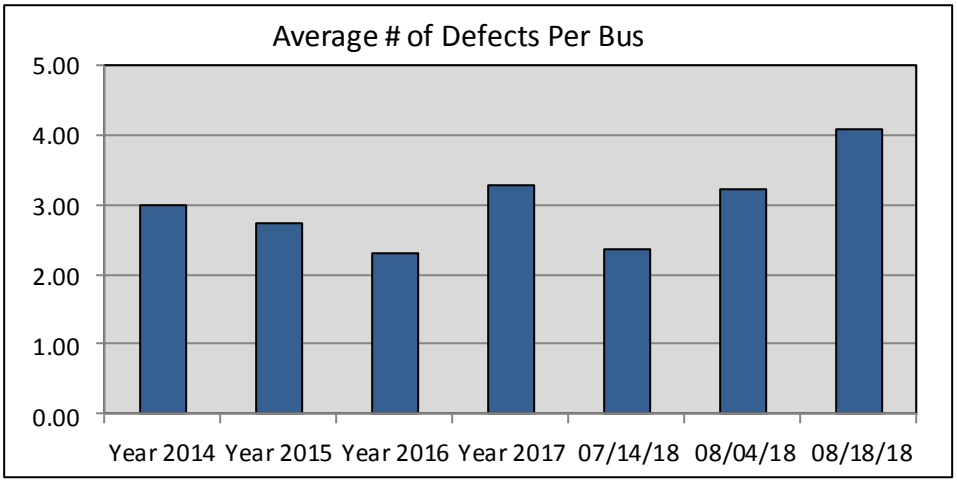
FINDINGS

Overall Fleet Condition

Ninety-eight (98) defects were found during this current audit, or 4.08 average defects per bus. The Audit Trend Comparison table which follows shows the average number of defects per audit and the average number of defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, and August 18 – 20, 2018 audit results. The table also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018, August 4 – 6, 2018, and August 18 – 2018 audit results.

Table 3 Audit Trend Comparison				
Date	**Average Defects Per Audit**	**Average Defects per Bus**	**Average Class "A" Defects Per Audit**	**Average Class "A" Defects per Bus**
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14–16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75
Aug. 18–20, 2018	98	4.08	81	3.38

As can be seen from Table 3 above and the chart below, the 4.08 average defects per bus found during this *current inspection is the highest average defects per bus experienced since TRC began conducting bi-monthly maintenance audits in 2014*. This sudden increase in "A" defects is worrisome and the root cause must be examined.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Electrical Systems, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, and Suspension/Steering categories. The Engine Compartment category, once again, showed the most defects during this audit, with a total of 29 defects compared to 34 Engine Compartment defects last audit, followed by the Suspension/Steering category with a total of 26 defects compared to 28 Suspension/Steering defects last audit.

Table 4 which follows compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018 and August 4 – 6, 2018 audit results. Critical areas of concern are highlighted in Table 4 below.

Table 4							
Summary of Defects by Category	**Year 2014 Average**	**Year 2015 Average**	**Year 2016 Average**	**Year 2017 Average**	**7/14/18**	**8/04/18**	**8/18/18**
Accessibility Features	7	2	3	3	3	4	3
Air System/Brake System	15	8	7	7	2	3	7
Climate Control	2	0	0	1	0	0	0
Destination Signs	1	0	0	0	0	0	0
Differential	1	1	1	1	1	0	0
Driver's Controls	5	2	1	2	0	2	0
Electrical System	2	1	1	1	1	0	1
Engine Compartment	36	27	24	34	18	34	29
Exhaust	0	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8	18	18
Interior Condition	13	13	4	10	2	1	2
Lights	7	6	5	6	2	3	10
Passenger Controls	1	1	1	2	0	2	2
Safety Equipment	7	4	1	1	0	0	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0	0
Suspension/Steering	10	10	10	19	21	28	26
Tires	3	1	3	2	1	4	0
Transmission	2	2	2	1	0	4	0
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**	**98**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**	**4.08**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories

- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Eighty-one (81) Class "A" safety-related defects were found during this inspection, for an average of 3.38 Class "A" safety-related defects per bus. The eighty-one (81) Class "A" defects found during this current audit are listed in Table 5 below.

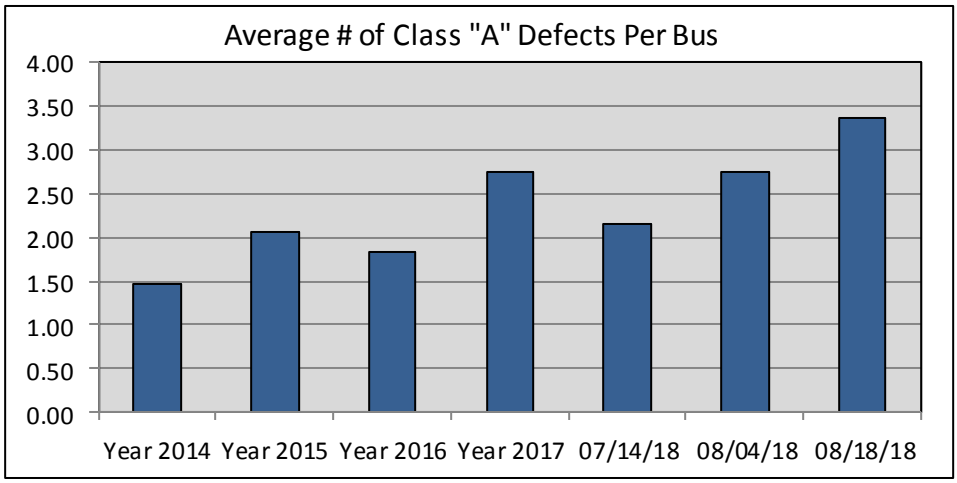
Table 5

Bus #	Year	Make	Class "A" Defects
62617	2011	Gillig	Trailering arm, C/S rear, worn
62617	2011	Gillig	Oil leak, engine compartment, hydraulic reservoir leaking
62619	2011	Gillig	Brakes, front, brake shoes worn to wear line
62619	2011	Gillig	Oil leak, air system, air compressor head gasket leaking
62623	2012	Gillig	A/C belt, engine compartment, cracked
62623	2012	Gillig	Oil leak, engine compartment, alternator front seal leaking
62623	2012	Gillig	Radius rod, C/S rear lower, worn
62623	2012	Gillig	Oil leak, engine compartment, air compressor gasket leaking
62641	2012	Gillig	Radius rods, C/S rear upper & lower, worn
62649	2012	Gillig	Radius rods, S/S rear upper, worn
62649	2012	Gillig	Oil leak, engine compartment, oil filler tube leaking
62652	2012	Gillig	Chamber mounting bracket, S/S front brakes, loose
62652	2012	Gillig	Radius rods, both rear lower, worn
62652	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
63139	2007	Gillig	Dome lamps, S/S #3, #4, #5 & C/S #5, inop
63139	2007	Gillig	Oil leak, engine compartment, fan motor leaking
63139	2007	Gillig	King pin, C/S, worn
63139	2007	Gillig	Drag link, at pitman arm, worn
63139	2007	Gillig	Radius rods, all rear, worn
63139	2007	Gillig	Stop request touch pad, S/S wheelchair position, missing
63141	2007	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63141	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63141	2007	Gillig	Radius rod, S/S rear lower, worn
63141	2007	Gillig	A/C belt, engine compartment, cracked
63144	2007	Gillig	Stepwell light, by #1 door, inop
63144	2007	Gillig	Courtesy light, by #3 & #4 doors, inop
63144	2007	Gillig	Wheelchair lift, front, safety strips inop
63144	2007	Gillig	Sway bar bushing, C/S front, worn
63144	2007	Gillig	Radius rods, both rear upper, worn
63144	2007	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63145	2007	Gillig	Wheelchair lift, front, front safety strip inop
63145	2007	Gillig	Coolant leak, engine compartment, coolant line to air compressor leaking
63146	2007	Gillig	Stepwell light, by #1 door, inop
63146	2007	Gillig	Courtesy light, by #3 & #4 doors, inop
63146	2007	Gillig	Oil leak, engine compartment, hydraulic fan leaking
63147	2007	Gillig	Stepwell light, by #2 door, inop
63147	2007	Gillig	Group strap, engine compartment to frame, broken off
63148	2007	Gillig	Sway bar bushings, front, cracked
63148	2007	Gillig	Oil leak, engine compartment, multiple oil leaks (engine dirty)
63148	2007	Gillig	Radius rods, rear lower, worn
63148	2007	Gillig	Radius rods, front lower, worn
63148	2007	Gillig	Skirt panels, S/S, damaged
63150	2007	Gillig	Dome lamps, S/S #3, #4 #5, inop
63150	2007	Gillig	Radius rods, both rear lower, worn
63159	2008	Gillig	Windshield, C/S, has BB hole
63159	2008	Gillig	Drag link, at pitman arm, worn
63188	2009	Gillig	A/C belt, engine compartment, cracked
63188	2009	Gillig	Alternator belt, engine compartment, cracked
63188	2009	Gillig	Radius rods, both front upper, worn
63188	2009	Gillig	Radius rods, both rear lower, worn
63188	2009	Gillig	Oil leak, engine compartment, rear main seal leaking
63188	2009	Gillig	Oil leak, engine compartment, oil pan leaking
63188	2009	Gillig	Oil leak, engine compartment, oil cooler leaking
63188	2009	Gillig	Dome lamps, C/S all & S/S #1, inop
63191	2009	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63191	2009	Gillig	Radius rods, both rear lower, worn
63191	2009	Gillig	Oil leak, engine compartment, oil filler tube leaking
63191	2009	Gillig	Dome lamps, S/S #1 & C/S #3 #4, inop
63192	2010	Gillig	Radius rod, S/S rear lower, worn
63195	2009	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63196	2010	Gillig	Alternator belt, engine compartment, cracked
63196	2010	Gillig	Oil leak, front, gear box leaking
63196	2010	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63196	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63196	2010	Gillig	Oil leaks, engine compartment, air compressor & hydraulic pump gasket leaking
63200	2010	Gillig	Windshield, S/S, has BB holes
63200	2010	Gillig	Radius rods, rear lower, worn
63200	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63204	2010	Gillig	Radius rods, both rear lower, worn
63204	2010	Gillig	Blow by, engine compartment, oil coming out of air box tube
63204	2010	Gillig	Oil leak, engine compartment, reservoir leaking
63210	2010	Gillig	Radius rods, front lower, both worn
63210	2010	Gillig	Air leak, S/S rear brakes, chamber hose leaking
63210	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63210	2010	Gillig	Oil leak, engine compartment, hydraulic fan motor leaking
63210	2010	Gillig	Wheelchair ramp, front, won't sit flush with floor (trip hazard)
63210	2010	Gillig	Bell cord, S/S rear, not secured
63211	2010	Gillig	A/C belt, engine compartment, cracked (replaced by mechanic)
63211	2010	Gillig	Radius rods, rear, all worn
63211	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks from top of engine, oil pan, rear main seal
63211	2010	Gillig	Dome lamps, C/S #3 & #4, inop

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 81 Class "A" defects found during this current inspection is the highest average Class "A" defects per bus experienced since TRC began conducting bi-monthly maintenance audits in 2014. <u>This trend is worrisome and TRC recommends the immediate development of a plan of action to correct this trend</u>.



<u>Comfort and Convenience</u>
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

<u>Structural Integrity</u>
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the twenty-four (24) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile

intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts.

SUMMARY OF RECOMMENDATIONS

- Eighty-one (81) Class "A" safety-related defects were found during this current audit, or 3.38 average Class "A" defects per bus, compared to 2.75 average Class "A" defects per bus the previous audit. The 3.38 average Class "A" defects found during this current audit is the highest average Class "A" defects per bus experienced since TRC began conducting bi-monthly maintenance audits in 2014. TRC continues to recommend that Prince George's County work with Transdev to come up with a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The total number of Class A defects in this category was 26 compared to 28 last audit and may be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item and defects identified continue to increase.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a total of twenty-two (22) engine compartment fluid leak defects, which included engine oil, hydraulic fluid, and coolant leaks.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Thirty-two (32) Buses

Conducted August 4 - 6, 2018

August 8, 2018

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-two (32) Buses
Conducted August 4 - 6, 2018

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-two (32) Buses
Conducted August 4 - 6, 2018

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted on August 4 - 6, 2018 by TRC for Prince George's County. Thirty-five (35) buses were scheduled for a fleet inspection and maintenance record review; however, three (3) buses were not available for inspection due to the following reasons: Bus 62633/transmission, Bus 62644/engine, and Bus 63142/oil leak.

- The results of this current audit are as follows:

Total Defects	103
Average Defects per Bus	3.22
Total Class "A" Safety-Related Defects	88
Average Class "A" Safety-Related Defects per Bus	2.75

  The Audit Trend Comparison table, which can be found on Page 5, shows the audit results averages for Year 2014, Year 2015, Year 2016 and Year 2017, and the July 14 – 16, 2018 and August 4 – 6, 2018 audit results.

- The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected.

- Positive observations from this audit include the following:
  - Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
  - PMI records were well organized and easy to locate;
  - All PMIs reviewed were conducted on schedule.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-two (32) buses received a physical inspection during this audit. Table 1 below identifies these 32 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE
62617	2011	Gillig
62618	2012	Gillig
62622	2011	Gillig
62627	2011	Gillig
62628	2011	Gillig
62630	2011	Gillig
62631	2011	Gillig
62634	2011	Gillig
62635	2011	Gillig
62636	2011	Gillig
62638	2011	Gillig
62639	2012	Gillig
62645	2012	Gillig
62647	2012	Gillig
62648	2012	Gillig
62651	2012	Gillig
62652	2012	Gillig
63140	2007	Gillig
63143	2007	Gillig
63148	2007	Gillig
63163	2008	Gillig
63189	2009	Gillig
63197	2010	Gillig
63199	2010	Gillig
63202	2010	Gillig
63204	2010	Gillig
63205	2010	Gillig
63206	2010	Gillig
63209	2010	Gillig
63210	2010	Gillig
63211	2010	Gillig
63214	2010	Gillig

Table 2 below identifies the three buses which were not available for inspection.

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62633	2011	Gillig	Transmission
62644	2012	Gillig	Engine
63142	2007	Gillig	Oil leak

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Tom Goodwin, Anthony Greenfield, and Alusine Kanu. Mike Rakidjian served as the project manager, organized the overall inspection process, and assisted in preparing the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals

To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-two (32) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs

To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-two (32) buses to determine if and when defects defined during the PMI process were repaired.
2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

Overall Fleet Condition

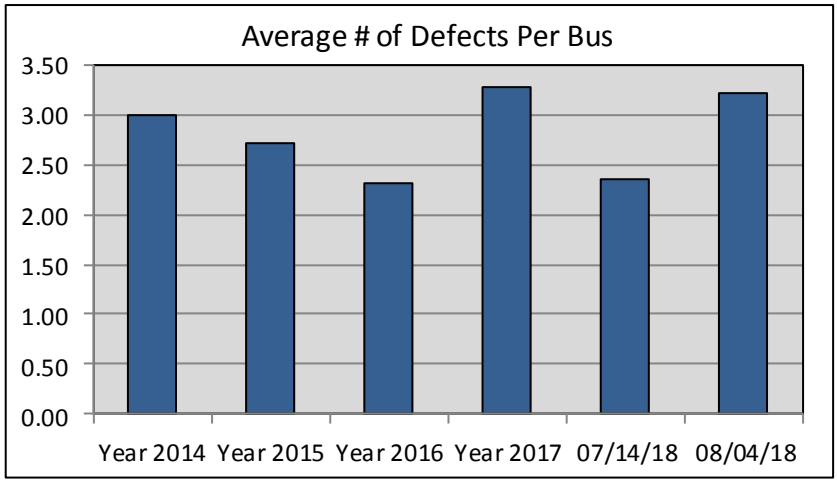
One hundred & three (103) defects were found during this current audit, or 3.22 average defects per bus. The Audit Trend Comparison table below shows the average number of defects per audit and the average number of defects per bus for the

audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and the July 14 – 16, 2018 and August 4 – 6, 2018 audit results. The table also shows the average number of Class "A" defects per audit and the average number of Class "A" defects per bus for the audits conducted in Year 2014, Year 2015, Year 2016, Year 2017, and July 14 – 16, 2018 and August 4 – 6, 2018 audit results.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
July 14-16,2018	59	2.36	54	2.16
Aug. 4–6, 2018	103	3.22	88	2.75

As can be seen from Table 3 above and the chart below, the 3.22 average defects per bus found during this current inspection is slightly lower than the average defects per bus for Year 2017, however, is higher than the average defects per bus for Year 2014, Year 2015, Year 2016 and the July 14 – 16, 2018 audit.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment category showed the most defects during this current audit, with a total of 34 defects compared to 18 Engine Compartment defects last audit.

Table 4 below compares key performance indicators from this current audit to the average audit results for Year 2014, Year 2015, Year 2016, and Year 2017, and the July 14-16 audit results.

Table 4						
Summary of Defects by Category	**Year 2014 Average**	**Year 2015 Average**	**Year 2016 Average**	**Year 2017 Average**	**7/14/18**	**8/0418**
Accessibility Features	7	2	3	3	3	4
Air System/Brake System	15	8	7	7	2	3
Climate Control	2	0	0	1	0	0
Destination Signs	1	0	0	0	0	0
Differential	1	1	1	1	1	0
Driver's Controls	5	2	1	2	0	2
Electrical System	2	1	1	1	1	0
Engine Compartment	36	27	24	34	18	34
Exhaust	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	8	18
Interior Condition	13	13	4	10	2	1
Lights	7	6	5	6	2	3
Passenger Controls	1	1	1	2	0	2
Safety Equipment	7	4	1	1	0	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	0
Suspension/Steering	10	10	10	19	21	28
Tires	3	1	3	2	1	4
Transmission	2	2	2	1	0	4
Total Defects	**126**	**98**	**74**	**105**	**59**	**103**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**2.36**	**3.22**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements.

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defect Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects

- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Eighty-eight (88) Class "A" safety-related defects were found during this inspection, for an average of 2.75 Class "A" safety-related defects per bus. The eighty-eight (88) Class "A" defects found during this current audit are listed in Table 5 which follows.

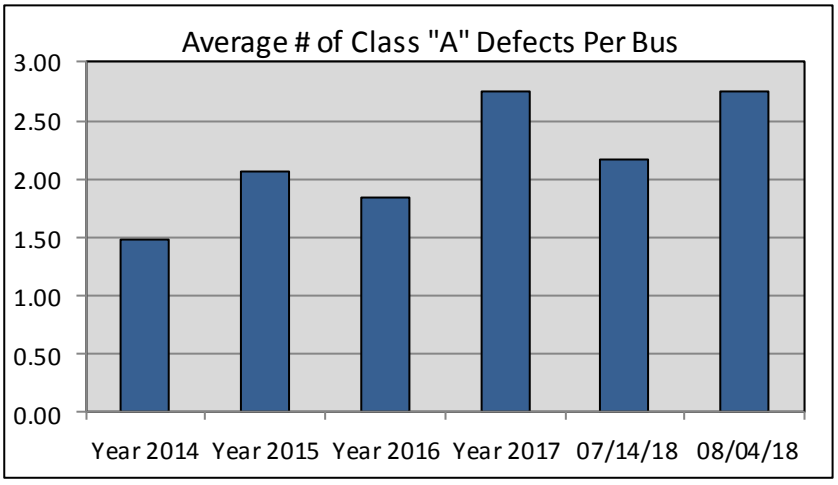
Table 5

Bus #	Year	Make	Class "A" Defects
62617	2011	Gillig	Tire, S/S rear outer, flat
62617	2011	Gillig	Radius rods, front, all worn
62618	2012	Gillig	Radius rods, rear upper, both worn
62622	2011	Gillig	Tire, C/S rear outer, damaged
62622	2011	Gillig	Radius rods, front & rear upper, worn
62627	2011	Gillig	Oil leak, steering, reservoir hose leaking
62628	2011	Gillig	Oil leak, engine compartment, oil cooler leaking
62628	2011	Gillig	Radius rod, rear lower, worn
62628	2011	Gillig	Oil leak, transmission, dip stick tube fitting @ transmission pan leaking
62630	2011	Gillig	Radius rods, rear upper, both worn
62630	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62630	2011	Gillig	Oil leak, engine compartment, alternator front seal leaking
62631	2011	Gillig	Coolant leak, engine compartment, front top of engine leaking
62635	2011	Gillig	Compartment door, battery, 1 lock missing & 1 latch broken
62635	2011	Gillig	A/C belt, engine compartment, cracked
62636	2011	Gillig	Coolant leak, engine compartment, radiator leaking
62636	2011	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
62636	2011	Gillig	Coolant leak, engine compartment, leaking from top of engine
62636	2011	Gillig	Marker lamp, C/S rear roof, inop
62638	2011	Gillig	Radius rods, rear lower, worn
62638	2011	Gillig	Oil leak, engine compartment, rear main seal leaking
62638	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62638	2011	Gillig	Oil leak, engine compartment, oil pan leaking
62639	2012	Gillig	Radius rods, rear lower, both worn
62639	2012	Gillig	Tires, rear, all worn
62639	2012	Gillig	Drag link, at pitman arm, worn
62645	2012	Gillig	Windshield, S/S, 2 BB holes
62645	2012	Gillig	Oil leak, engine compartment, oil pressure switch leaking
62645	2012	Gillig	Drag link, at pitman arm, worn
62645	2012	Gillig	Oil leak, engine compartment, alternator front seal leaking
62645	2012	Gillig	Dome lamp, C/S #3, inop
62647	2012	Gillig	Radius rod, C/S rear lower, worn
62647	2012	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62648	2012	Gillig	Bike rack, front, won't lock in down position
62648	2012	Gillig	Drag link, at pitman arm, worn
62648	2012	Gillig	Radius rods, front & rear, all rods worn
62648	2012	Gillig	Tires, C/S rear, worn
62648	2012	Gillig	Coolant leak, engine compartment, coolant filter leaking
62648	2012	Gillig	Window, driver's window, latch broken
62652	2012	Gillig	Oil leak, engine compartment, rear main seal leaking
62652	2012	Gillig	Oil leak, engine compartment, oil pressure switch leaking
63140	2007	Gillig	Tanks, all tanks, full of water (air dryer not working)
63140	2007	Gillig	Radius rod, rear lower, worn
63140	2007	Gillig	Oil leaks, engine compartment, multiple oil leaks @ bottom of engine
63143	2007	Gillig	Radius rods, rear, all worn
63143	2007	Gillig	Oil leak, engine compartment, oil cooler leaking
63148	2007	Gillig	Wheelchair lift, front, intermittent
63148	2007	Gillig	Shaft coupling, front, worn
63148	2007	Gillig	Sway bar link, C/S, worn
63163	2008	Gillig	Drag link, at king pin, worn
63163	2008	Gillig	Radius rods, rear, all worn
63163	2008	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63163	2008	Gillig	Windshield, S/S, cracked
63163	2008	Gillig	Oil leak, engine compartment, fain motor leaking
63189	2009	Gillig	Oil leak, engine compartment, alternator front seal leaking
63189	2009	Gillig	King pin, C/S, worn
63189	2009	Gillig	Stop request, all, inop
63189	2009	Gillig	Oil leak, engine compartment, oil pan leaking
63189	2009	Gillig	Radius rods, rear lower, both worn
63197	2010	Gillig	Oil leak, steering, both reservoir lines leaking
63199	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63199	2010	Gillig	Radius rods, rear lower, both worn
63202	2010	Gillig	Wheelchair ramp, front, not flush with floor / trip hazard

Table 5			
Bus #	**Year**	**Make**	**Class "A" Defects**
63202	2010	Gillig	Oil leak, engine compartment, oil pan leaking
63202	2010	Gillig	Coolant pipe bracket, engine compartment, broken
63202	2010	Gillig	Coolant filter bracket, engine compartment, bolt missing
63204	2010	Gillig	Coolant pipe bracket, engine compartment, broken off in transmission
63204	2010	Gillig	Radius rods, rear lower, both worn
63204	2010	Gillig	Windshield washer, C/S, inop
63205	2010	Gillig	Stop request tape, C/S flip-up seat, inop
63206	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63209	2010	Gillig	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63209	2010	Gillig	Courtesy lamps, by #3 & #4 doors, inop
63210	2010	Gillig	Wheelchair ramp, front, not flush with floor / trip hazard
63210	2010	Gillig	King pin, C/S, worn
63210	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63211	2010	Gillig	Oil leak, engine compartment, dip stick tube leaking
63211	2010	Gillig	Oil leak, engine compartment, rear main seal leaking
63211	2010	Gillig	Radius rods, rear, all worn
63211	2010	Gillig	Oil leak, engine compartment, air compressor gasket leaking
63211	2010	Gillig	Drag link, at pitman arm, worn
63214	2010	Gillig	Wheelchair ramp, front, inop
63214	2010	Gillig	Radius rods, front & rear upper, worn
63214	2010	Gillig	Oil leak, engine compartment, fan motor leaking
63214	2010	Gillig	Oil leak, engine compartment, hydraulic pump leaking
63214	2010	Gillig	Oil leak, engine compartment, oil cooler leaking
63214	2010	Gillig	Oil leak, engine compartment, oil filter leaking
63214	2010	Gillig	Wet tank, air system, no air coming out (clogged)

As can be seen in the Audit Trend Comparison table on Page 5 and the chart which follows, the 88 Class "A" defects found during this current audit inspection is the same as the average defects per bus for Year 2017 however, is higher than the average defects per bus for Year 2014, Year 2015, Year 2016 and the July 14 – 16, 2018 audit results.



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean and in good condition.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-two (32) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts.

SUMMARY OF RECOMMENDATIONS

- Eighty-eight (88) Class "A" safety-related defects were found during this audit, or 2.75 average Class "A" defects per bus. The 2.75 average Class "A" defects per bus is the same when compared to the average Class "A" defects per bus for Year 2017, however, increased when compared to the average Class "A" defects per bus for Year 2014, Year 2015, Year 2016, and the July 14 – 16, 2018 audit results. TRC continues to recommend that Prince George's County work with Transdev to come up with a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- TRC recommends that utility personnel be instructed on how to properly fill the engines with fluids, such as hydraulic fluid. The hydraulic reservoir is being overfilled, causing fluid to overflow all over the bottom of the engines.

- TRC continues to recommend that special attention be placed on inspection and repair of suspension and steering components. The number of Class A defects in this category increased this current audit compared to the previous audit and may be a result of improper inspections or deferred maintenance. Steering and suspension components are a critical safety item.

- TRC recommends renewed emphasis on preventing and correcting engine compartment fluid leaks. This inspection showed a sharp increase in leaks including engine oil, hydraulic fluid, and coolant.

- TRC continues to recommend when washing buses that special attention be paid to the front corners of the bus exteriors. The soap used to wash the buses is causing black streaks and water run marks on the front corners of the buses below the windshield.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Inspection #79
Thirty-nine (39) Buses

Conducted June 1 - 2, 2019

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

June 6, 2019

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-nine (39) Buses
Conducted June 1 - 2, 2019

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty-nine (39) Buses
Conducted June 1 - 2, 2019

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted June 1- 2, 2019 by TRC for Prince George's County. Fifty-three (53) buses were scheduled for the fleet inspection and maintenance record review. In total, thirty-nine (39) buses were inspected. Ten (10) buses were not available for inspection due to the following reasons: Bus 62639/engine, Bus 63092/A/C and W/C inop, Bus 63139/charge air cooler, Bus/63148 accident, Bus 63166/transmission, Bus 63189/accident, Bus 63192/accident, Bus 63201/accident, Bus 63214/oil cooler, and Bus 63216/stop engine light. As with previous audits, *TRC is concerned about the high number of buses not available for inspection*. In this case, **19% of the buses selected were not available for inspection** for the various reasons listed above, compared to 33% the previous audit. This is a significant improvement, and in line with the FTA guideline to carry a maximum spare ratio of 20% to account for vehicle downtime. The four remaining buses (units 62644, 62652, 63150 and 63164) were not inspected due to time limitation.

The results of this current audit are as follows:

Total Defects	196
Average Defects per Bus	5.03
Total Class "A" Safety-Related Defects	132
Average Class "A" Safety-Related Defects per Bus	3.38

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18 and the audit results for all audits conducted to date in 2019. **The average number of total defects and Class "A" defects per bus continues to be unacceptably high and increased this current audit when compared to the previous audit.** The average number of total defects per bus is the highest when compared to all annual averages and the audit results of all audits conducted to date in 2019, and the average number of Class "A" defects is the highest of all audits conducted by TRC with the exception of the March 2-4, 2019 audit.

TRC has repeatedly voiced our concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. After this meeting, TRC reported a noticeable but short-lasting improvement in the condition of the fleet during the December 2018 audits. The short-term improvement has proven to be non-sustainable. The results of this current audit continue to show increases when compared to previous audit results. TRC does not have confidence in Transdev's corrective action and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for 37% of all defects found, compared to 53% last audit. Although this is a slight improvement, TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty-nine (39) buses received a physical inspection during this audit. Table 1 below identifies these 39 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE	MOST RECENT PM
62617	2011	Gillig	05/16/19
62618	2012	Gillig	05/05/19
62619	2011	Gillig	05/07/19
62620	2011	Gillig	05/29/19
62621	2011	Gillig	05/23/19
62624	2011	Gillig	05/09/19
62629	2011	Gillig	05/19/19
62630	2011	Gillig	05/18/19
62632	2011	Gillig	05/28/19
62635	2011	Gillig	05/26/19
62637	2011	Gillig	05/17/19
62641	2012	Gillig	05/16/19
62646	2012	Gillig	05/20/19
62651	2012	Gillig	05/06/19
63140	2007	Gillig	05/22/19
63144	2007	Gillig	05/17/19
63145	2007	Gillig	05/06/19
63146	2007	Gillig	05/20/19
63147	2007	Gillig	05/14/19
63160	2008	Gillig	05/30/19
63161	2008	Gillig	05/13/19
63162	2008	Gillig	05/23/19
63168	2008	Gillig	05/19/19
63188	2009	Gillig	05/24/19
63195	2009	Gillig	05/25/19
63196	2010	Gillig	05/19/19
63197	2010	Gillig	03/04/19
63198	2010	Gillig	05/26/19
63199	2010	Gillig	05/23/19
63200	2010	Gillig	05/25/19
63204	2010	Gillig	05/12/19
63205	2010	Gillig	05/24/19
63206	2010	Gillig	05/29/19
63207	2010	Gillig	05/15/19
63208	2010	Gillig	05/03/19
63211	2010	Gillig	05/18/19
63212	2010	Gillig	05/22/19
63215	2010	Gillig	05/20/19
63217	2010	Gillig	04/30/19

Table 2 which follows identifies the 10 buses that were not inspected during this current audit. *TRC continues to be concerned about the high number of buses not available for inspection. Nineteen percent (19%) of buses selected for this audit were not available for inspection compared to 33% the previous audit.*

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62639*	2012	Gillig	Engine
63092*	2006	Gillig	A/C & W/C inop
63139	2007	Gillig	Charge air cooler
63148*	2007	Gillig	Accident
63166*	2008	Gillig	Transmission
63189*	2009	Gillig	Accident
63192	2010	Gillig	Accident
63201*	2010	Gillig	Accident
63214	2010	Gillig	Oil cooler
63216	2010	Gillig	Stop engine light

*Note: Bus has been unavailable for inspections for 2 months or longer

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit. The inspection team members were Sebastian Silvani, Sylvester Fikes, Alusine Kanu, and Anthony Greenfield. Sebastian Silvani also served as the project manager, organized the overall inspection process, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights

13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;
- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty-nine (39) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty-nine (39) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

Overall Fleet Condition

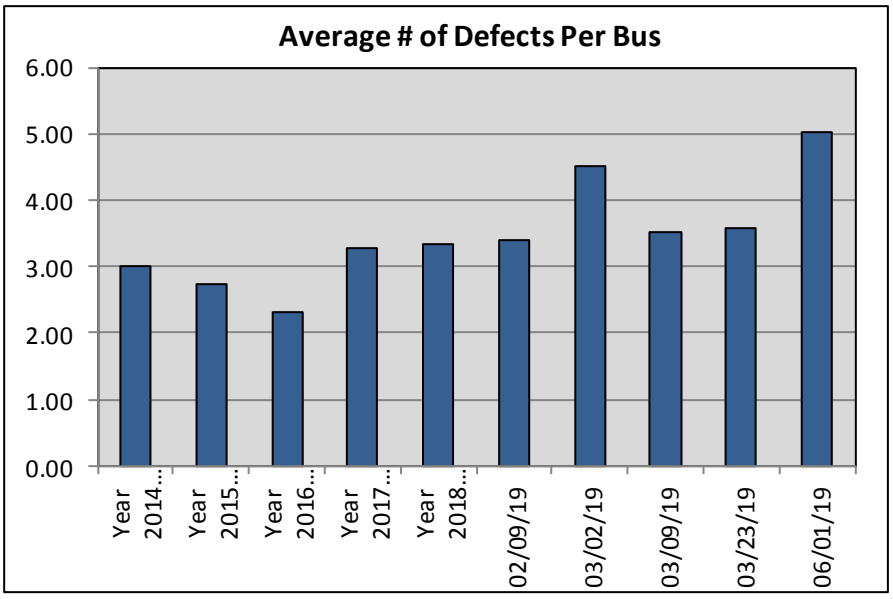
One hundred & ninety-six (196) defects were found during this current audit, or 5.03 average defects per bus. The average number of total defects per bus increased this current audit when compared to all annual averages and the audit results of all audits conducted to date in 2019. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of total defects per audit and the annual average number of total defects per bus for the audits conducted in years 2014-18 and the audit results for all audits conducted to date in 2019. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18 and the audit results for all audits conducted to date in 2019.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
Year 2018	97	3.34	85	2.93
Feb. 9–11, 2019	92	3.41	81	3.00
March 2–4, 2019	135	4.50	114	3.80
March 9–11, 2019	102	3.52	81	2.79
March 23-25, 2019	104	3.59	93	3.21
June 1-2, 2019	196	5.03	132	3.38

As shown in the table above and the chart which follows, the average number of defects per bus increased when compared to all annual averages and all audits conducted to date in 2019. **The number of defects remains unacceptably high.** As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Differential, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment remains as the primary concern, comprising 37% of the total defects, compared to 53% last audit. **Engine compartment defects represent a critical fire risk.** This audit showed a significant increase in Air System/Brake System related defects. Earlier this year, a bus with presumed water in the air lines nearly caught on fire. Along with other issues, the County is cautioned that poor air system maintenance could lead to catastrophic failures, including fires. Other categories of concern due to a higher than acceptable number of defects include Exterior Body Condition, Lights, and Suspension/Steering.

The Summary of Defects by Category table which follows compares key performance indicators from this current audit to the average annual results and the results of the all audits conducted to date in 2019. The number of Engine Compartment defects discovered during this current audit is the highest amount experienced to date and continues to be a critical area of concern for this current audit.

Table 4
Summary of Defect by Category

Summary of Defects by Category	Year 2014 Avg	Year 2015 Avg	Year 2016 Avg	Year 2017 Avg	Year 2018 Avg	Insp #75 Feb 2019	Insp #76 Mar 2019	Insp #77 Mar 2019	Insp #78 Mar 2019	Insp #79 Jun 2019
Accessibility Features	7	2	3	3	2	3	4	6	5	5
Air System/Brake System	15	8	7	7	4	1	13	5	2	40
Climate Control	2	0	0	1	0	2	0	0	0	0
Destination Signs	1	0	0	0	0	0	1	0	1	0
Differential	1	1	1	1	0	0	0	0	0	1
Driver's Controls	5	2	1	2	1	3	2	1	3	3
Electrical System	2	1	1	1	0	0	0	0	0	0
Engine Compartment	36	27	24	34	44	37	48	39	55	72
Exhaust	0	0	0	0	0	0	0	0	0	0

Table 4 Summary of Defect by Category										
Summary of Defects by Category	Year 2014 Avg	Year 2015 Avg	Year 2016 Avg	Year 2017 Avg	Year 2018 Avg	Insp #75 Feb 2019	Insp #76 Mar 2019	Insp #77 Mar 2019	Insp #78 Mar 2019	Insp #79 Jun 2019
Exterior Body Condition	15	18	12	12	13	9	16	22	12	27
Interior Condition	13	13	4	10	2	2	16	3	0	7
Lights	7	6	5	6	5	15	22	10	13	15
Passenger Controls	1	1	1	2	1	0	1	0	0	1
Safety Equipment	7	4	1	1	0	0	2	0	1	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	1	0	0	0	0
Suspension/Steering	10	10	10	19	22	13	9	11	10	14
Tires	3	1	3	2	2	2	0	2	0	3
Transmission	2	2	2	1	2	4	1	3	2	8
Total Defects	**126**	**98**	**74**	**105**	**97**	**92**	**135**	**102**	**104**	**196**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**3.34**	**3.41**	**4.50**	**3.52**	**3.59**	**5.03**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the Lights category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects represent the lack of attention from the maintenance department that may lead to substantial safety lapses. **If simple defects are not detected and repaired, TRC has little confidence in Transdev's ability to identify and repair serious or complex issues**.

Table 5		
Bus #	Last PMI	Class A "Lights" Defects
62617	05/16/19	Door, interior front door, inop
62620	05/29/19	H5 light, S/S, inop
62630	05/18/19	Door light, front interior door, inop
63145	05/06/19	Light, C/S interior #3 light, inop
63146	05/20/19	Light, C/S interior #1 light, inop
63146	05/20/19	Light, S/S #5 light, inop
63160	05/30/19	Light, C/S #5 interior light, inop
63168	05/19/19	Light, C/S #4 light, inop
63188	05/24/19	Lights, C/S all lights, inop
63198	05/26/19	Light, C/S #3 interior light, inop
63204	05/12/19	Light, C/S #4 interior light, inop
63204	05/12/19	Dome light, front, inop
63211	05/18/19	Lights, C/S interior #1 & #2, inop
63211	05/18/19	Light, S/S interior #1, inop
63217	04/30/19	Light, S/S interior #2 light, inop

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

One hundred & thirty-two (132) Class "A" safety-related defects were found during this inspection, for an average of 3.38 Class "A" safety-related defects per bus compared to 3.21 average Class "A" safety-related defects the previous audit. The 132 Class "A" defects found during this current audit are listed in Table 6 which follows.

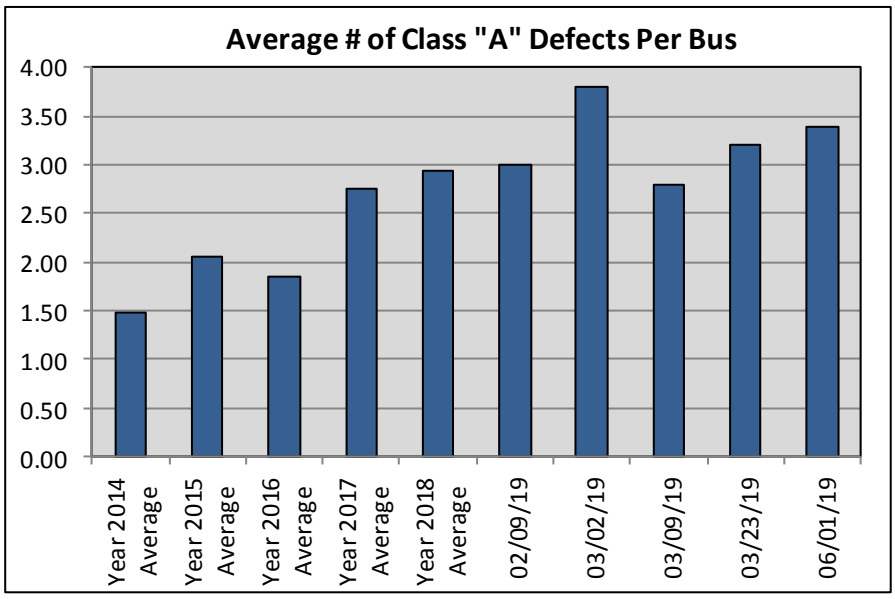
Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
62617	2011	Gillig	05/16/19	Coolant leak, engine compartment, radiator hose
62618	2012	Gillig	05/05/19	Windshield, S/S, has a chip
62618	2012	Gillig	05/05/19	Windshield, C/S, has a chip
62618	2012	Gillig	05/05/19	Slack adjuster, front brake, out of adjustment
62618	2012	Gillig	05/05/19	Air leak, S/S, brake chamber leaking
62619	2011	Gillig	05/07/19	Roller, rear, knocking / flat spot
62620	2011	Gillig	05/29/19	Wheelchair ramp, front door, inop
62620	2011	Gillig	05/29/19	Oil leaks, engine compartment, multiple oil leaks
62620	2011	Gillig	05/29/19	Brake chambers, front both sides, out of adjustment
62621	2011	Gillig	05/23/19	Brake chamber, C/S rear, brake not releasing properly
62621	2011	Gillig	05/23/19	Windshield, C/S, has a chip
62621	2011	Gillig	05/23/19	Oil leak, engine compartment, oil cooler leaking
62621	2011	Gillig	05/23/19	Oil leak, engine compartment, oil pan leaking
62624	2011	Gillig	05/09/19	Check engine light, driver's controls, on
62624	2011	Gillig	05/09/19	Oil leak, engine compartment, air compressor leaking
62629	2011	Gillig	05/19/19	Oil leak, engine compartment, front alternator seal
62629	2011	Gillig	05/19/19	A/C belt & idler, engine compartment, alignment off
62629	2011	Gillig	05/19/19	Bench seat, S/S, does not latch on bottom position
62629	2011	Gillig	05/19/19	Check engine light, driver's controls, on
62629	2011	Gillig	05/19/19	Oil leak, transmission, small leak @ drain plug
62630	2011	Gillig	05/18/19	Door light, front interior door, inop
62630	2011	Gillig	05/18/19	Windshield wiper blades, C/S & S/S, worn
62630	2011	Gillig	05/18/19	Oil leak, transmission, light transmission leak
62632	2011	Gillig	05/28/19	Oil leak, engine compartment, alternator seal leaking
62632	2011	Gillig	05/28/19	A/C belt, engine compartment, cracked
62632	2011	Gillig	05/28/19	Check engine light, driver's controls, on
62635	2011	Gillig	05/26/19	Kneel alarm, front, inop
62635	2011	Gillig	05/26/19	ABS light, driver's controls, on
62637	2011	Gillig	05/17/19	Oil leak, engine compartment, air compressor leaking
62637	2011	Gillig	05/17/19	Oil leak, engine compartment, filler mount gasket leaking
62637	2011	Gillig	05/17/19	Oil leak, engine compartment, drain plug leaking (mechanic tightened)
62641	2012	Gillig	05/16/19	Tire, C/S rear inside, worn
62641	2012	Gillig	05/16/19	Coolant pipe, transmission, bracket/bolt missing
62641	2012	Gillig	05/16/19	Water separator, engine compartment, bolt missing in bracket
62641	2012	Gillig	05/16/19	Oil leak, engine compartment, fan motor leaking
62641	2012	Gillig	05/16/19	Oil leaks, engine compartment, multiple oil leaks
62646	2012	Gillig	05/20/19	King pin, front, worn (both sides)
62646	2012	Gillig	05/20/19	Radius rods, rear bottom both sides, worn
62646	2012	Gillig	05/20/19	Oil leak, engine compartment, oil pressure switch
62646	2012	Gillig	05/20/19	Oil leak, transmission, leak at transmission vent
62646	2012	Gillig	05/20/19	Brakes, rear both sides, out of adjustment
62651	2012	Gillig	05/06/19	Tie rod end, C/S front, worn
62651	2012	Gillig	05/06/19	Drag link, C/S front @ pitman arm, worn
62651	2012	Gillig	05/06/19	Radius rods, rear lower, both worn
62651	2012	Gillig	05/06/19	Oil leak, engine compartment, drain plug leaking
62651	2012	Gillig	05/06/19	Oil leak, engine compartment, oil pan gasket leaking
63140	2007	Gillig	05/22/19	Air leak, rear, brake valve leaking
63140	2007	Gillig	05/22/19	Oil leak, top of engine, leak undetermined
63140	2007	Gillig	05/22/19	ABS light, driver's controls, on

Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
63144	2007	Gillig	05/17/19	Wheelchair ramp, front, won't deploy
63144	2007	Gillig	05/17/19	Oil leak, engine compartment, air compressor leaking
63146	2007	Gillig	05/20/19	Oil leak, engine compartment, hydraulic leak @ fan motor
63146	2007	Gillig	05/20/19	Oil leak, engine compartment, filler tube @ block leaking
63147	2007	Gillig	05/14/19	Oil leak, engine compartment, alternator front seal
63160	2008	Gillig	05/30/19	Wheelchair lift, front, inop
63160	2008	Gillig	05/30/19	ABS light, driver's controls, on
63160	2008	Gillig	05/30/19	Brakes, all four, out of adjustment
63160	2008	Gillig	05/30/19	Battery compartment door, S/S front, lock broken
63161	2008	Gillig	05/13/19	Windshield, S/S, has a chip
63161	2008	Gillig	05/13/19	Oil leak, engine compartment, fan motor leaking
63161	2008	Gillig	05/13/19	Oil leak, engine compartment, oil cooler leaking
63162	2008	Gillig	05/23/19	Slack adjusters, S/S & C/S rear, out of adjustment
63162	2008	Gillig	05/23/19	Slack adjuster, S/S front, out of adjustment
63162	2008	Gillig	05/23/19	Coolant leak, engine compartment, coolant leak @ preheat box
63162	2008	Gillig	05/23/19	Oil leak, engine compartment, oil cooler leaking
63162	2008	Gillig	05/23/19	Oil leak, engine compartment, oil filler tube leaking
63162	2008	Gillig	05/23/19	Oil leak, transmission, transmission drain plug leaking
63168	2008	Gillig	05/19/19	Oil leak, engine compartment, front alternator seal
63168	2008	Gillig	05/19/19	Oil leak, engine compartment, A/C compressor seal
63168	2008	Gillig	05/19/19	Oil leak, engine compartment, fan motor leaking
63168	2008	Gillig	05/19/19	Oil leak, engine compartment, oil leak @ rear main seal
63168	2008	Gillig	05/19/19	Oil leak, transmission, leak @ drain plug
63188	2009	Gillig	05/24/19	Lights, C/S all lights, inop
63188	2009	Gillig	05/24/19	Shock absorber, C/S front, loose
63188	2009	Gillig	05/24/19	Tires, 3 rear tires, worn
63188	2009	Gillig	05/24/19	Oil leak, engine compartment, oil cooler leaking
63188	2009	Gillig	05/24/19	Coolant leak, engine compartment, air compressor leaking
63195	2009	Gillig	05/25/19	Oil leak, engine compartment, alternator bottom seal leaking
63195	2009	Gillig	05/25/19	Check engine light, driver's controls, on
63195	2009	Gillig	05/25/19	Wheelchair ramp, front, won't deploy
63195	2009	Gillig	05/25/19	Oil leak, engine compartment, fan motor leaking
63196	2010	Gillig	05/19/19	Radius rod, C/S front upper, worn
63196	2010	Gillig	05/19/19	Radius rod, S/S front upper, worn
63196	2010	Gillig	05/19/19	Check engine light, driver's controls, on
63196	2010	Gillig	05/19/19	Oil leak, engine compartment, rear oil pan or rear main seal leaking
63196	2010	Gillig	05/19/19	Oil leak, engine compartment, leak near air compressor & oil pump
63197	2010	Gillig	03/04/19	Oil leak, engine compartment, small oil leak @ front cover
63197	2010	Gillig	03/04/19	Brakes, front, need adjustment
63198	2010	Gillig	05/26/19	Check engine light, driver's controls, on
63198	2010	Gillig	05/26/19	ABS light, driver's controls, on
63198	2010	Gillig	05/26/19	Brakes, all four, out of adjustment
63199	2010	Gillig	05/23/19	ABS light, driver's controls, on
63199	2010	Gillig	05/23/19	King pin, front, worn
63199	2010	Gillig	05/23/19	Oil leak, engine compartment, air compressor gasket

Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
				leaking
63200	2010	Gillig	05/25/19	Radius rod, C/S front, worn
63200	2010	Gillig	05/25/19	Oil leak, engine compartment, leak @ air compressor
63200	2010	Gillig	05/25/19	Oil leak, engine compartment, oil filler tube leaking @ housing
63200	2010	Gillig	05/25/19	Oil leak, engine compartment, leak @ crankcase vent tube
63204	2010	Gillig	05/12/19	Dome light, front, inop
63204	2010	Gillig	05/12/19	ABS light, driver's controls, on
63204	2010	Gillig	05/12/19	Slack adjusters, all brakes, need adjustment
63204	2010	Gillig	05/12/19	Oil leak, engine compartment, oil cooler has small leak
63204	2010	Gillig	05/12/19	Oil leak, engine compartment, oil leak @ pan gasket
63205	2010	Gillig	05/24/19	Check engine light, driver's controls, on
63205	2010	Gillig	05/24/19	Oil leak, engine compartment, oil leak @ oil cooler
63206	2010	Gillig	05/29/19	Check engine light, driver's controls, on
63206	2010	Gillig	05/29/19	Oil leaks, engine compartment, multiple leaks
63206	2010	Gillig	05/29/19	Coolant leak, engine compartment, leak @ filter (mechanic tightened)
63206	2010	Gillig	05/29/19	Radius rod, C/S rear upper, worn
63207	2010	Gillig	05/15/19	Tie rod, front, loose @ pitman arm
63207	2010	Gillig	05/15/19	Brake shoes, front, worn
63207	2010	Gillig	05/15/19	Slack adjusters, front, not properly adjusted
63207	2010	Gillig	05/15/19	Check engine light, driver's controls, on
63207	2010	Gillig	05/15/19	Transmission coolant line bracket, S/S transmission, broken
63207	2010	Gillig	05/15/19	Oil leak, engine compartment, oil leak @ oil pan
63208	2010	Gillig	05/03/19	ABS light, driver's controls, on
63208	2010	Gillig	05/03/19	King pin, R/S front, worn
63211	2010	Gillig	05/18/19	Brakes, S/S rear, need adjustment
63211	2010	Gillig	05/18/19	Oil leak, engine compartment, leak @ oil filter
63211	2010	Gillig	05/18/19	Coolant pipe, transmission, bracket broken
63211	2010	Gillig	05/18/19	Oil leak, engine compartment, alternator front seal leaking
63212	2010	Gillig	05/22/19	Brake shoes, both front shoes, shoes worn to wear bar
63212	2010	Gillig	05/22/19	Tire, C/S rear inside tire, flat (replaced)
63212	2010	Gillig	05/22/19	Oil leak, engine compartment, hose going to oil filler tube leaking
63215	2010	Gillig	05/20/19	Radius rods, rear lower radius rods, both worn
63215	2010	Gillig	05/20/19	Oil leak, C/S engine compartment, oil leak (unknown source)
63217	2010	Gillig	04/30/19	Oil leak, engine compartment, front seal leaking oil
63217	2010	Gillig	04/30/19	ABS light, driver's controls, on
63217	2010	Gillig	04/30/19	Oil leak, engine compartment, oil pan leaking
63217	2010	Gillig	04/30/19	Oil leak, engine compartment, timing cover leaking
63217	2010	Gillig	04/30/19	Oil leak, engine compartment, oil filler tube @ block leaking
63217	2010	Gillig	04/30/19	Oil leak, engine compartment, oil cooler leaking

Note in the table above that several significant defects were found even when the last PMI occurred within a week of our inspection.

The average number of Class "A" defects per bus increased this current audit when compared to all annual averages and the audit results of all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit. **Engine oil leaks continue to be a major defect found and contribute to increased fire risk.**



Comfort and Convenience
During this audit, TRC found the interiors of buses to be kept clean.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-nine (39) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Sebastian Silvani reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. ***Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects****. A review of inspector's qualifications and training is recommended.*

SUMMARY OF RECOMMENDATIONS

The average number of total defects per bus is the highest when compared to all annual averages and the audit results of all audits conducted to date in 2019, and the average number of Class "A" defects is the highest of all audits conducted by TRC with the exception of the March 2-4, 2019 audit.

One hundred & thirty two (132) Class "A" safety-related defects were found during this current audit, or 3.38 average Class "A" defects per bus, compared to 3.21 average Class "A" defects per bus last audit. TRC continues to caution the County noting that the improvements shown after the November 15, 2018 meeting have proven to not be sustainable, and a proper corrective plan must be put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- **TRC continues to recommend that the County establish a maximum defects-per-bus goal to hold Transdev accountable.**

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC recommends a thorough review of Air System/Brake System inspection and maintenance. This audit discovered multiple brakes out of adjustment and multiple air tanks with excess water. Without improved inspection and maintenance practices, the County is at elevated risk of bus accident or fire.

- TRC continues to recommend that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC continues to recommend a review of the number of buses that are unavailable for inspection during each audit. The current number of unavailable buses is unacceptable to maintain operations and meet daily pull-out.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Inspection #78
Twenty-nine (29) Buses

Conducted March 23 - 25, 2019

March 27, 2019

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
Twenty-nine (29) Buses
Conducted March 23 - 25, 2019

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-nine (29) Buses
Conducted March 23 - 25, 2019

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted March 23-25, 2019 by TRC for Prince George's County. Fifty (50) buses were scheduled for the fleet inspection and maintenance record review. In total, twenty-nine (29) buses were inspected. Fourteen (14) buses were not available for inspection due to the following reasons: Bus 62637/engine, Bus 62639/engine, Bus 62652/engine, Bus 63092/wheelchair & air conditioning, Bus 63147/would not start, Bus 63148/accident, Bus 63164/accident, Bus 63166/transmission, Bus 63189/accident, Bus 63197/at Cummins, Bus 63199/transmission, Bus 63201/accident, Bus 63207/transmission, and Bus 63216/engine. As with previous audits, *TRC is concerned about the high number of buses not available for inspection*. In this case, **33% of the buses selected were not available for inspection** for the various reasons listed above, compared to 36% the previous audit. The FTA guideline is to carry a maximum spare ratio of 20% to account for vehicle downtime. The seven remaining buses (units 62620, 62621, 62629, 62632, 63145, 63146 & 63168) were not inspected due to time limitation and lack of manpower.

The results of this current audit are as follows:

Total Defects	104
Average Defects per Bus	3.59
Total Class "A" Safety-Related Defects	93
Average Class "A" Safety-Related Defects per Bus	3.21

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18 and the audit results for all audits conducted to date in 2019. The average number of **total defects and Class "A" defects per bus continues to be unacceptably high and increased this current audit** when compared to all annual averages and the audit results of all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit.

TRC has repeatedly voiced our concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. After this meeting, TRC reported a noticeable, but short lasting improvement in the condition of the fleet during the December 2018 audits. The short-term improvement has proven to be non-sustainable. The results of this current audit continue to show increases when compared to previous audit results. TRC does not have confidence in Transdev's corrective action and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for 53% of all defects found and increased from 38% last audit. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Twenty-nine (29) buses received a physical inspection during this audit. Table 1 below identifies these 29 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE	MOST RECENT PM
62625	2011	Gillig	02/28/19
62627	2011	Gillig	03/21/19
62634	2011	Gillig	03/14/19
62635	2011	Gillig	02/28/19
62636	2011	Gillig	03/24/19
62642	2012	Gillig	03/20/19
62645	2012	Gillig	03/05/19
62647	2012	Gillig	02/13/19
62648	2012	Gillig	03/13/19
63139	2007	Gillig	03/20/19
63140	2007	Gillig	02/21/19
63144	2007	Gillig	02/28/19
63151	2007	Gillig	03/21/19
63159	2008	Gillig	03/05/19
63160	2008	Gillig	02/28/19
63163	2008	Gillig	03/20/19
63169	2008	Gillig	03/20/19
63188	2009	Gillig	03/13/19
63191	2009	Gillig	03/14/19
63192	2010	Gillig	03/06/19
63194	2009	Gillig	02/28/19
63196	2010	Gillig	02/24/19
63198	2010	Gillig	12/06/18
63202	2010	Gillig	03/20/19
63204	2010	Gillig	02/23/19
63209	2010	Gillig	02/28/19
63212	2010	Gillig	12/03/18
63214	2010	Gillig	03/12/19
63215	2010	Gillig	03/08/19

Table 2 which follows identifies the 21 buses that were not inspected during this current audit. Fourteen of these buses were unavailable for inspection and the remaining seven were not inspected due to time limitation. *TRC continues to be concerned about the high number of buses not available for inspection. Thirty-three percent (33%) of buses selected for this audit were not available for inspection compared to 36% the previous audit.*

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62637	2011	Gillig	Engine
62639*	2012	Gillig	Engine
62652*	2012	Gillig	Engine
63092*	2006	Gillig	Wheelchair & A/C
63147	2007	Gillig	Would Not Start
63148*	2007	Gillig	Accident
63164	2008	Gillig	Accident
63166	2008	Gillig	Transmission
63189*	2009	Gillig	Accident
63197	2010	Gillig	At Cummins
63199	2010	Gillig	Transmission
63201	2010	Gillig	Accident
63207	2010	Gillig	Transmission
63216	2010	Gillig	Engine
62620	2011	Gillig	Time Limitation
62621	2011	Gillig	Time Limitation
62629	2011	Gillig	Time Limitation
62632	2011	Gillig	Time Limitation
63145	2007	Gillig	Time Limitation
63146	2007	Gillig	Time Limitation
63168	2008	Gillig	Time Limitation

*Note: Bus has been unavailable for inspections for 2 months or longer

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Sylvester Fikes, Alusine Kanu, and Anthony Greenfield. Sebastian Silvani served as the project manager, organized the overall inspection process, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment

9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;

- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-nine (29) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-nine (29) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

Overall Fleet Condition

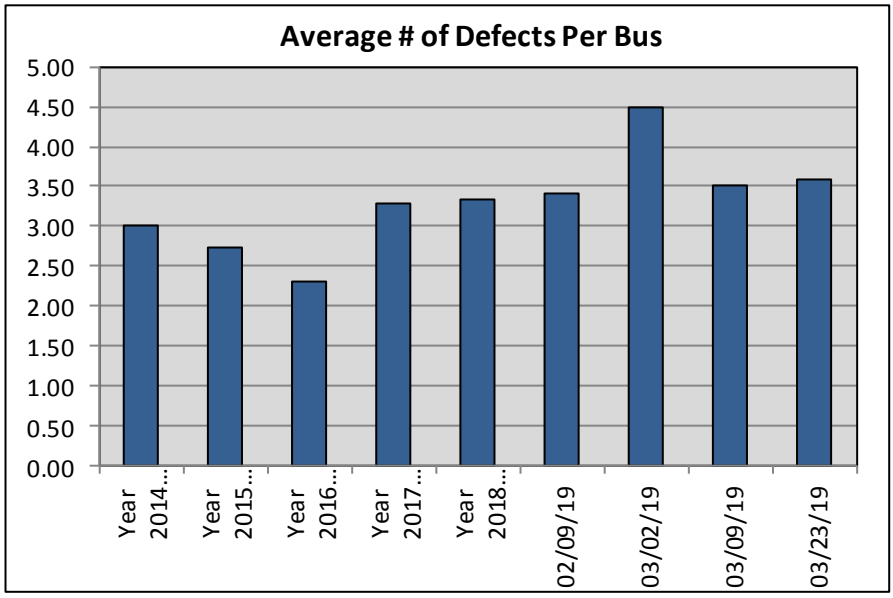
One hundred & four (104) defects were found during this current audit, or 3.59 average defects per bus. The average number of total defects per bus increased this current audit when compared to all annual averages and the audit results of all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of total defects per audit and the annual average number of total defects per bus for the audits conducted in years 2014-18 and the audit results for all audits conducted to date in 2019. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18 and the audit results for all audits conducted to date in 2019.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
Year 2018	97	3.34	85	2.93
Feb. 9–11, 2019	92	3.41	81	3.00
March 2–4, 2019	135	4.50	114	3.80
March 9–11, 2019	102	3.52	81	2.79
March 23-25, 2019	104	3.59	93	3.21

As shown in the table above and the chart which follows, the average number of total defects per bus increased when compared to all annual averages and all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit. **The number of defects remains unacceptably high.** As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Destination Signs, Driver's Controls, Engine Compartment, Exterior Body Condition, Lights, Safety Equipment, Suspension/Steering, and Transmission categories. The Engine Compartment remains as the primary concern, comprising 53% of the total defects, compared to 38% last audit. **Engine compartment defects represent a critical fire risk.** Other categories of concern due to higher than acceptable number of defects include Suspension/Steering, Exterior Body Condition, and Lights. On a positive note, the Air System/Brake System category continued to see a significant decrease in defects.

The Summary of Defects by Category table which follows compares key performance indicators from this current audit to the average annual results and the results of the all audits conducted to date in 2019. The number of Engine Compartment defects discovered during this current audit is the highest amount experienced to date and continues to be a critical area of concern for this current audit.

Table 4 Summary of Defect by Category									
Summary of Defects by Category	**Year 2014 Avg**	**Year 2015 Avg**	**Year 2016 Avg**	**Year 2017 Avg**	**Year 2018 Avg**	**Insp #75 Feb 2019**	**Insp #76 Mar 2019**	**Insp #77 Mar 2019**	**Insp #78 Mar 2019**
Accessibility Features	7	2	3	3	2	3	4	6	5
Air System/Brake System	15	8	7	7	4	1	13	5	2
Climate Control	2	0	0	1	0	2	0	0	0
Destination Signs	1	0	0	0	0	0	1	0	1
Differential	1	1	1	1	0	0	0	0	0
Driver's Controls	5	2	1	2	1	3	2	1	3
Electrical System	2	1	1	1	0	0	0	0	0
Engine Compartment	36	27	24	34	44	37	48	39	55
Exhaust	0	0	0	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	13	9	16	22	12
Interior Condition	13	13	4	10	2	2	16	3	0
Lights	7	6	5	6	5	15	22	10	13
Passenger Controls	1	1	1	2	1	0	1	0	0
Safety Equipment	7	4	1	1	0	0	2	0	1
Structure/Chassis/ Fuel Tank	2	1	1	2	0	1	0	0	0
Suspension/Steering	10	10	10	19	22	13	9	11	10
Tires	3	1	3	2	2	2	0	2	0
Transmission	2	2	2	1	2	4	1	3	2
Total Defects	**126**	**98**	**74**	**105**	**97**	**92**	**135**	**102**	**104**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**3.34**	**3.41**	**4.50**	**3.52**	**3.59**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the Lights category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects (yet still a Class A defect) represent the lack of attention from the maintenance department that may lead to substantial safety lapses. **If simple defects are not detected and repaired, TRC has little confidence in Transdev's ability to identify and repair serious or complex issues**.

Table 5		
Bus #	**Last PMI**	**Class A "Lights" Defects**
62625	02/28/19	Marker lamp, rear roof center, inop
62636	03/24/19	Marker lamp, rear roof, inop
62648	03/13/19	Dome lamp, C/S #2, inop
63140	02/21/19	Dome lamp, C/S #5, inop
63144	02/28/19	Light, driver's light, inop
63151	03/21/19	Stepwell & courtesy lights, front & rear, inop
63159	03/05/19	Dome lamp, C/S #2, inop

Table 5		
Bus #	**Last PMI**	**Class A "Lights" Defects**
63163	03/20/19	Dome lamps, C/S #3 & #4, inop
63188	03/13/19	Dome lamps, C/S, all inop
63191	03/14/19	Dome lamps, C/S #3 #4 #5 & S/S #1, inop
63194	02/28/19	Dome lamp, C/S #2, inop
63196	02/24/19	Marker lamp, rear roof, inop
63214	03/12/19	Dome lamp, C/S #4, inop

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Ninety-three (93) Class "A" safety-related defects were found during this inspection, for an average of 3.21 Class "A" safety-related defects per bus compared to 2.79 average Class "A" safety-related defects the previous audit. The 93 Class "A" defects found during this current audit are listed in Table 6 which follows.

Table 6

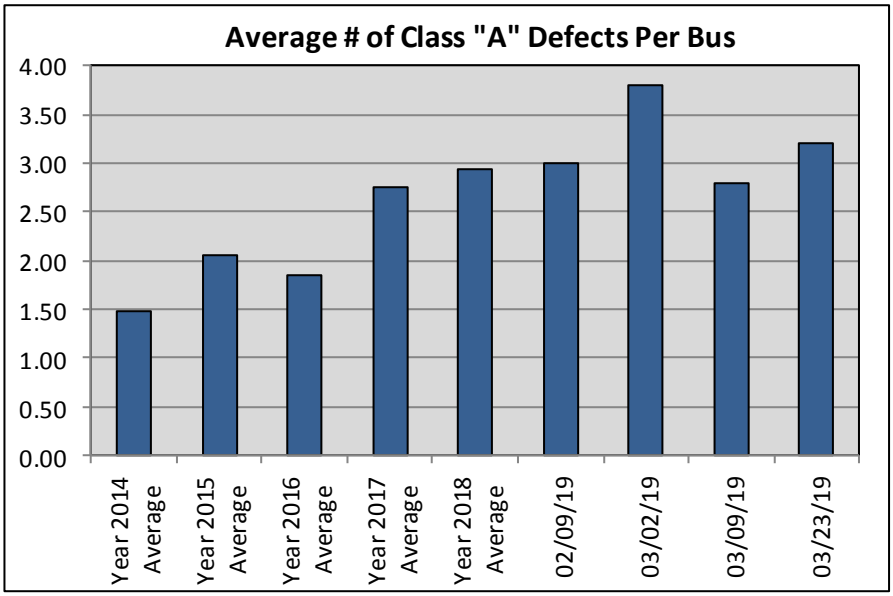
Bus #	Year	Make	Last PMI	Class "A" Defects
62625	2011	Gillig	02/28/19	Oil leak, engine compartment, alternator seal leaking
62625	2011	Gillig	02/28/19	Marker lamp, rear roof center, inop
62625	2011	Gillig	02/28/19	Oil leak, engine compartment, rear main seal leaking
62625	2011	Gillig	02/28/19	Oil leak, engine compartment, oil cooler leaking
62625	2011	Gillig	02/28/19	Oil leak, engine compartment, leaking between air compressor & hydraulic pump
62625	2011	Gillig	02/28/19	Windshield washer, front, inop
62627	2011	Gillig	03/21/19	Oil leak, engine compartment, rear main seal leaking
62627	2011	Gillig	03/21/19	Oil leak, engine compartment, oil cooler leaking
62627	2011	Gillig	03/21/19	Oil leak, engine compartment, air compressor gasket leaking
62634	2011	Gillig	03/14/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62635	2011	Gillig	02/28/19	Oil leak, engine compartment, #1 injector connection leaking @ wire plug
62636	2011	Gillig	03/24/19	Marker lamp, rear roof, inop
62636	2011	Gillig	03/24/19	Oil leak, engine compartment, air compressor gasket leaking
62636	2011	Gillig	03/24/19	Oil leak, engine compartment, oil pan leaking
62636	2011	Gillig	03/24/19	Oil leak, engine compartment, rear main seal leaking
62636	2011	Gillig	03/24/19	Oil leak, engine compartment, alternator seal leaking
62642	2012	Gillig	03/20/19	Wheelchair alarm, front, inop
62642	2012	Gillig	03/20/19	Oil leak, engine compartment, steering reservoir leaking
62642	2012	Gillig	03/20/19	Oil leak, engine compartment, rear main seal leaking
62642	2012	Gillig	03/20/19	Oil leak, engine compartment, oil pressure switch leaking
62645	2012	Gillig	03/05/19	Oil leak, engine compartment, valve cover gasket leaking
62645	2012	Gillig	03/05/19	Oil leak, engine compartment, alternator seal leaking
62645	2012	Gillig	03/05/19	Coolant leak, engine compartment, coolant leak around turbo
62645	2012	Gillig	03/05/19	Oil leak, engine compartment, oil pan leaking
62645	2012	Gillig	03/05/19	Oil leak, engine compartment, timing cover leaking
62647	2012	Gillig	02/13/19	Oil leak, engine compartment, rear main seal leaking
62647	2012	Gillig	02/13/19	Oil leak, engine compartment, air compressor gasket leaking
62647	2012	Gillig	02/13/19	Oil leak, engine compartment, alternator seal leaking
62647	2012	Gillig	02/13/19	Radius rod, S/S rear lower, worn
62647	2012	Gillig	02/13/19	Oil leak, engine compartment, oil filler tube leaking
62648	2012	Gillig	03/13/19	Oil leak, engine compartment, leaking between air compressor & hydraulic pump
62648	2012	Gillig	03/13/19	Dome lamp, C/S #2, inop
63139	2007	Gillig	03/20/19	Oil leak, engine compartment, alternator seal leaking
63139	2007	Gillig	03/20/19	Oil leak, engine compartment, oil cooler leaking
63139	2007	Gillig	03/20/19	Oil leak, engine compartment, rear main seal leaking
63140	2007	Gillig	02/21/19	Dome lamp, C/S #5, inop

Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
63140	2007	Gillig	02/21/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63140	2007	Gillig	02/21/19	Booster fan, driver's compartment, inop
63144	2007	Gillig	02/28/19	Wheelchair lift, front, very slow / gets stuck at times
63144	2007	Gillig	02/28/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63144	2007	Gillig	02/28/19	Oil leak, engine compartment, steering reservoir leaking
63144	2007	Gillig	02/28/19	Light, driver's light, inop
63144	2007	Gillig	02/28/19	Auxiliary fan, driver's compartment, inop
63151	2007	Gillig	03/21/19	Radius rods, both rear lower, worn
63151	2007	Gillig	03/21/19	Oil leak, engine compartment, leaking between air compressor & hydraulic pump
63151	2007	Gillig	03/21/19	Wheelchair lift, front, intermittent
63151	2007	Gillig	03/21/19	Coolant line, engine compartment, coolant line to hydraulic fan collapsed / gets stuck
63151	2007	Gillig	03/21/19	Stepwell & courtesy lights, front & rear, inop
63159	2008	Gillig	03/05/19	Fuel leak, engine compartment, fuel leak by injector pump
63159	2008	Gillig	03/05/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63159	2008	Gillig	03/05/19	Oil leak, engine compartment, hydraulic fan motor leaking
63159	2008	Gillig	03/05/19	Dome lamp, C/S #2, inop
63160	2008	Gillig	02/28/19	Oil leak, engine compartment, fan control valve leaking
63160	2008	Gillig	02/28/19	Radius rod, S/S rear lower, worn
63163	2008	Gillig	03/20/19	Dome lamps, C/S #3 & #4, inop
63163	2008	Gillig	03/20/19	Hydraulic fan, engine compartment, inop
63169	2008	Gillig	03/20/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63188	2009	Gillig	03/13/19	Dome lamps, C/S, all inop
63188	2009	Gillig	03/13/19	Test lamp switch, driver's compartment, inop
63188	2009	Gillig	03/13/19	Brake shoes, front, worn to wear line
63188	2009	Gillig	03/13/19	Oil leak, engine compartment, rear main seal leaking
63188	2009	Gillig	03/13/19	Oil leak, engine compartment, oil cooler leaking
63191	2009	Gillig	03/14/19	Dome lamps, C/S #3 #4 #5 & S/S #1, inop
63191	2009	Gillig	03/14/19	Oil leak, engine compartment, hydraulic fan motor leaking
63191	2009	Gillig	03/14/19	Oil leak, S/S transmission, drain plug leaking
63191	2009	Gillig	03/14/19	A/C belt, engine compartment, cracked
63192	2010	Gillig	03/06/19	Brake shoes, S/S rear, worn to wear line
63192	2010	Gillig	03/06/19	Route sign, rear, scrambled
63194	2009	Gillig	02/28/19	Wheelchair ramp, front, no power
63194	2009	Gillig	02/28/19	Oil leak, engine compartment, oil cooler leaking
63194	2009	Gillig	02/28/19	Oil leak, engine compartment, leaking between air compressor & hydraulic pump
63194	2009	Gillig	02/28/19	Radius rod, C/S upper rear, worn
63194	2009	Gillig	02/28/19	Dome lamp, C/S #2, inop
63196	2010	Gillig	02/24/19	Marker lamp, rear roof, inop
63196	2010	Gillig	02/24/19	Oil leak, engine compartment, rear main seal leaking
63196	2010	Gillig	02/24/19	Oil leak, engine compartment, air compressor gasket leaking
63204	2010	Gillig	02/23/19	Oil leak, engine compartment, air compressor gasket

Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
				leaking
63204	2010	Gillig	02/23/19	Oil leak, engine compartment, oil cooler leaking
63204	2010	Gillig	02/23/19	Oil leak, at transmission, filler tube leaking
63204	2010	Gillig	02/23/19	Oil leak, engine compartment, rear main seal leaking
63209	2010	Gillig	02/28/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63212	2010	Gillig	12/03/18	Oil leak, engine compartment, steering reservoir leaking
63214	2010	Gillig	03/12/19	Window, C/S #2, shattered
63214	2010	Gillig	03/12/19	Dome lamp, C/S #4, inop
63214	2010	Gillig	03/12/19	Radius rods, both rear lower, worn
63214	2010	Gillig	03/12/19	Oil leak, engine compartment, oil cooler leaking
63214	2010	Gillig	03/12/19	Oil leak, engine compartment, leaking between air compressor & hydraulic pump
63214	2010	Gillig	03/12/19	Wheelchair ramp, front, won't deploy
63215	2010	Gillig	03/08/19	Drag link, at pitman arm, worn
63215	2010	Gillig	03/08/19	Radius rods, both rear lower, worn
63215	2010	Gillig	03/08/19	Oil leak, engine compartment, oil cooler leaking
63215	2010	Gillig	03/08/19	Oil leak, engine compartment, oil pan leaking
63215	2010	Gillig	03/08/19	Oil leak, engine compartment, air compressor gasket leaking

Note in the table above that several significant defects were found even when the last PMI occurred within a week of our inspection.

The average number of Class "A" defects per bus increased this current audit when compared to all annual averages and the audit results of all audits conducted to date in 2019 with the exception of the March 2-4, 2019 audit. **Engine oil leaks continue to be a major defect found and contribute to increased fire risk.**



Comfort and Convenience

During this audit, TRC found the interiors of buses to be kept clean.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty-six (36) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. ***Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects****. A review of inspector's qualifications and training is recommended.*

SUMMARY OF RECOMMENDATIONS

The average number of total defects and Class "A" defects per bus is the second highest recorded, and higher than all annual averages.

Ninety-three (93) Class "A" safety-related defects were found during this current audit, or 3.21 average Class "A" defects per bus, compared to 2.79 average Class "A" defects per bus last audit. TRC cautioned that the improvements shown after the November 15, 2018 meeting would be sustainable only if a proper plan was put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- **TRC continues to recommend that the County establish a maximum defects-per-bus goal to hold Transdev accountable.**

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- Due to the numerous damaged curbside compartment door defects found during this current audit, TRC recommends that a road supervisor investigate the cause of these defects (i.e. obstacles at bus stops, etc.) or additional driver training be provided.

- TRC continues to recommend that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC continues to recommend a review of the number of buses that are unavailable for inspection during each audit. The current number of unavailable buses is unacceptable to maintain operations and meet daily pull-out.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Inspection #77
Twenty-nine (29) Buses

Conducted March 9 - 11, 2019

March 13, 2019

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-nine (29) Buses
Conducted March 9 - 11, 2019

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Twenty-nine (29) Buses
Conducted March 9 - 11, 2019

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted March 9-11, 2019 by TRC for Prince George's County. Forty-five (45) buses were scheduled for the fleet inspection and maintenance record review. In total, twenty-nine (29) buses were inspected. Sixteen (16) buses were not available for inspection due to the following reasons: Bus 62629/transmission, Bus 62637 /would not start, Bus 62639/engine, Bus 62652/engine, Bus 63092/wheelchair & air conditioning, Bus 63148/accident, Bus 63164/accident, Bus 63166/transmission, Bus 63189/accident, Bus 63198/engine, Bus 63199/transmission, Bus 63201/accident, Bus 63207/transmission, Bus 63212/engine, Bus 63215/DPF, and Bus 63216/engine. As with previous audits, *TRC is concerned about the high number of buses not available for inspection*. In this case, **over 35% of the buses selected were not available for inspection** for the various reasons listed above, compared to 27% the previous audit. The FTA guideline is to carry a maximum spare ratio of 20% to account for vehicle downtime.

The results of this current audit are as follows:

Total Defects	102
Average Defects per Bus	3.52
Total Class "A" Safety-Related Defects	81
Average Class "A" Safety-Related Defects per Bus	2.79

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18 and the audit results for all audits conducted to date in 2019. Results from this current audit show a decrease in both the average number of total defects per bus and the average number of Class "A" defects per bus compared to the audit results from the previous audit. Although the total defects per bus declined, the results for this current audit are higher than desired and higher than all annual averages and the February 9–11, 2019 audit results. The number of Class "A" defects per bus results for this current audit are also higher than the annual averages for years 2014-17.

TRC has repeatedly voiced our concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. After this meeting, TRC reported a noticeable improvement in the condition of the fleet during the December 2018 audits, but cautioned that it was too early to tell if the improvement was sustainable. As mentioned above, the results of this current audit show an improvement when compared to the March 2-4, 2019 audit; however, continue to show increases when compared to previous audit results. TRC does not have confidence in Transdev's corrective action and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for more than 38% of all defects found and increased from more than 35% last audit. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Twenty-nine (29) buses received a physical inspection during this audit. Table 1 below identifies these 29 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE	MOST RECENT PM
62622	2011	Gillig	02/12/19
62623	2012	Gillig	03/03/19
62625	2011	Gillig	02/28/19
62626	2011	Gillig	02/28/19
62627	2011	Gillig	01/27/19
62628	2011	Gillig	01/30/19
62631	2011	Gillig	01/07/19
62633	2011	Gillig	03/05/19
62638	2011	Gillig	03/01/19
62640	2012	Gillig	02/19/19
62643	2012	Gillig	02/28/19
62646	2012	Gillig	02/28/19
62649	2012	Gillig	02/07/19
62650	2012	Gillig	02/11/19
63141	2007	Gillig	03/07/19
63142	2007	Gillig	01/14/19
63143	2007	Gillig	02/15/19
63149	2007	Gillig	02/28/19
63161	2008	Gillig	01/13/19
63165	2008	Gillig	02/28/19
63167	2008	Gillig	02/15/19
63190	2009	Gillig	02/17/19
63193	2009	Gillig	02/27/19
63202	2010	Gillig	02/28/19
63203	2010	Gillig	03/05/19
63205	2010	Gillig	02/06/19
63206	2010	Gillig	03/05/19
63210	2010	Gillig	02/16/19
63213	2010	Gillig	02/28/19

Table 2 which follows identifies the sixteen buses that were not available for inspection. *TRC continues to be concerned about the high number of buses not available for inspection. Thirty-six percent (36%) of buses selected for this audit were not available for inspection compared to 27% the previous audit.*

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62629	2011	Gillig	Transmission
62637	2011	Gillig	Would not start
*62639	2012	Gillig	Engine
62652	2012	Gillig	Engine
*63092	2006	Gillig	Wheelchair & A/C
63148	2007	Gillig	Accident
63164	2006	Gillig	Accident
63166	2006	Gillig	Transmission
*63189	2009	Gillig	Accident
*63198	2010	Gillig	Engine
63199	2010	Gillig	Transmission
63201	2010	Gillig	Accident
63207	2010	Gillig	Transmission
63212	2010	Gillig	Engine
63215	2010	Gillig	DPG
63216	2010	Gillig	Engine

*Note: Bus has been unavailable for inspections for 3 months or longer

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of five bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Jim Wilson, Sylvester Fikes, Alusine Kanu, and Anthony Greenfield. Sebastian Silvani served as the project manager, organized the overall inspection process, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights

13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering
17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;

- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the twenty-nine (29) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the twenty-nine (29) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

Overall Fleet Condition

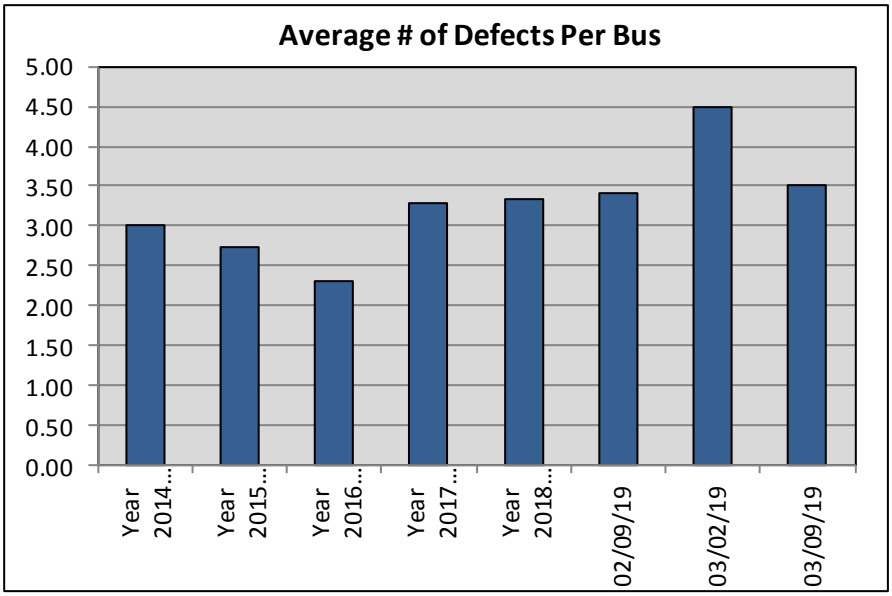
One hundred & two (102) defects were found during this current audit, or 3.52 average defects per bus. This is a decrease when compared to the previous audit conducted March 2–4, 2019, however, is higher than all annual averages and the February 9–11, 2019 audit results. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of defects per audit and the annual average number of defects per bus for the audits conducted in years 2014-18 and the audit results for all audits conducted to date in 2019. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18 and the audit results for all audits conducted to date in 2019.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
Year 2018	97	3.34	85	2.93
Feb. 9 – 11, 2019	92	3.41	81	3.00
March 2 – 4, 2019	135	4.50	114	3.80
March 9 – 11, 2019	102	3.52	81	2.79

As shown in the table above and the chart which follows, the average number of defects per bus decreased this current audit, however, is higher than all annual averages and the February 9–11, 2019 audit results. This slight decrease is not expected to be part of a longer term trend and the condition of the fleet continues to be a cause for concern. As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Suspension/Steering, Tires, and Transmission categories. The Engine Compartment remains as the primary concern, comprising over 38% of the total defects. **Engine compartment defects represent a critical fire risk.** Other categories of concern due to higher than acceptable number of defects include Suspension/Steering, Exterior Body Condition, and Lights. On a positive note, the Air System/Brake System category saw a significant decrease in defects.

The Summary of Defects by Category table which follows compares key performance indicators from this current audit to the average annual results and the results of the all audits conducted to date in 2019. Although the Engine Compartment defects decreased when compared to the previous audit, the number remains high and continues to be a critical area of concern for this current audit.

Table 4 Summary of Defect by Category								
Summary of Defects by Category	**Year 2014 Avg**	**Year 2015 Avg**	**Year 2016 Avg**	**Year 2017 Avg**	**Year 2018 Avg**	**Insp #75 Feb 2019**	**Insp #76 Mar 2019**	**Insp #77 Mar 2019**
Accessibility Features	7	2	3	3	2	3	4	6
Air System/Brake System	15	8	7	7	4	1	13	5
Climate Control	2	0	0	1	0	2	0	0
Destination Signs	1	0	0	0	0	0	1	0
Differential	1	1	1	1	0	0	0	0
Driver's Controls	5	2	1	2	1	3	2	1
Electrical System	2	1	1	1	0	0	0	0
Engine Compartment	36	27	24	34	44	37	48	39
Exhaust	0	0	0	0	0	0	0	0
Exterior Body Condition	15	18	12	12	13	9	16	22
Interior Condition	13	13	4	10	2	2	16	3
Lights	7	6	5	6	5	15	22	10
Passenger Controls	1	1	1	2	1	0	1	0
Safety Equipment	7	4	1	1	0	0	2	0
Structure/Chassis/ Fuel Tank	2	1	1	2	0	1	0	0
Suspension/Steering	10	10	10	19	22	13	9	11
Tires	3	1	3	2	2	2	0	2
Transmission	2	2	2	1	2	4	1	3
Total Defects	**126**	**98**	**74**	**105**	**97**	**92**	**135**	**102**
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**3.34**	**3.41**	**4.50**	**3.52**

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.*

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the Lights category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects (yet still a Class A defect) represent the lack of attention from the maintenance department that may lead to substantial safety lapses. **If simple defects are not detected and repaired, TRC has little confidence in Transdev's ability to identify and repair serious or complex issues**.

Table 5		
Bus #	**Last PMI**	**Class A "Lights" Defects**
62623	03/03/19	Dome lamps, S/S #4 & #5, inop
63141	03/07/19	Step well light, by #1 door, inop
63141	03/07/19	Overhead light, driver's compartment, inop
63143	02/15/19	Dome lamps, S/S #2 & #5, inop
63149	02/28/19	Courtesy lights, by #3 & #4 doors, inop
63161	01/13/19	Dome lamp, C/S #5, inop

Table 5		
Bus #	**Last PMI**	**Class A "Lights" Defects**
63165	02/28/19	Dome lamps, C/S #1 #3 #4 #5 & S/S #5, inop
63190	02/17/19	Courtesy lamps, by #3 & #4 doors, inop
63190	02/17/19	Dome lamp, C/S #5, inop
63202	02/28/19	Dome lamp, S/S #1, inop

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories
- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

Eighty-one (81) Class "A" safety-related defects were found during this inspection, for an average of 2.79 Class "A" safety-related defects per bus compared to 3.80 average Class "A" safety-related defects the previous audit. The 81 Class "A" defects found during this current audit are listed in Table 6 which follows.

Table 6

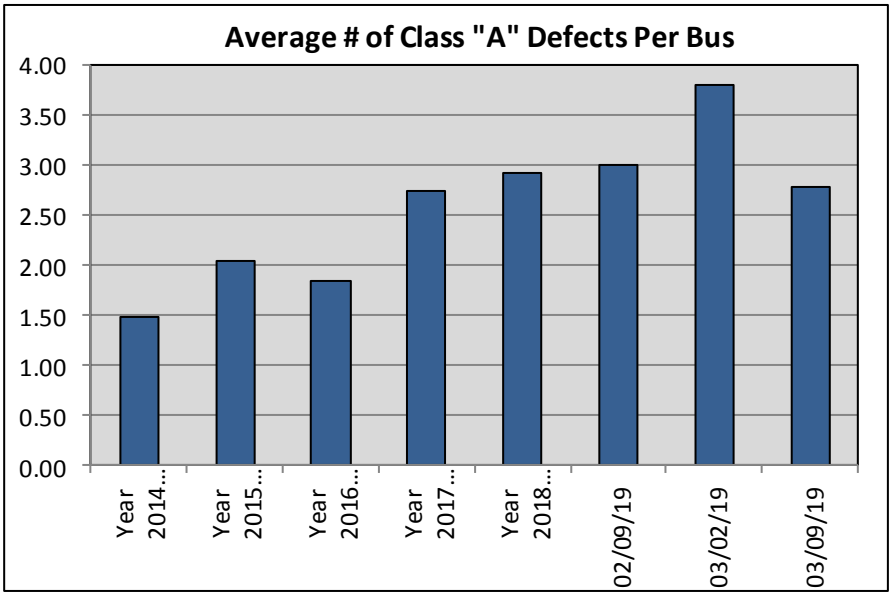
Bus #	Year	Make	Last PMI	Class "A" Defects
62622	2011	Gillig	02/12/19	Oil leak, engine compartment, alternator front seal leaking
62622	2011	Gillig	02/12/19	Coolant leak, engine compartment, surge tank cap leaking
62622	2011	Gillig	02/12/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62622	2011	Gillig	02/12/19	Coolant pipe bracket, engine compartment, bolt broken in transmission
62623	2012	Gillig	03/03/19	Dome lamps, S/S #4 & #5, inop
62623	2012	Gillig	03/03/19	Windshield, S/S, BB hole
62625	2011	Gillig	02/28/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62626	2011	Gillig	02/28/19	A/C belt, engine compartment, cracked
62626	2011	Gillig	02/28/19	Oil leak, engine compartment, alternator front seal leaking
62626	2011	Gillig	02/28/19	Oil leak, steering, reservoir leaking
62627	2011	Gillig	01/27/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62627	2011	Gillig	01/27/19	Wheelchair flip-up seat, S/S #1 forward facing seat, won't lock
62628	2011	Gillig	01/30/19	Oil leak, engine compartment, rear main seal leaking
62628	2011	Gillig	01/30/19	Interlock, rear door, won't come on (repaired by mechanic)
62628	2011	Gillig	01/30/19	Wheelchair flip-up seat, C/S, won't lock in down position
62631	2011	Gillig	01/07/19	Drag link, both ends, worn
62631	2011	Gillig	01/07/19	Brake shoes, both rear, half of shoes making contact with drum
62633	2011	Gillig	03/05/19	King pin, C/S, worn
62633	2011	Gillig	03/05/19	Coolant leak, engine compartment, surge tank cap leaking
62633	2011	Gillig	03/05/19	Oil leak, engine compartment, air compressor gasket leaking
62633	2011	Gillig	03/05/19	Oil leak, engine compartment, oil cooler leaking
62633	2011	Gillig	03/05/19	Oil leak, C/S engine compartment, oil pan gasket leaking
62638	2011	Gillig	03/01/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62640	2012	Gillig	02/19/19	Wheelchair ramp, front, won't stow (gets stuck)
62640	2012	Gillig	02/19/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62643	2012	Gillig	02/28/19	Oil leak, engine compartment, oil cooler leaking
62643	2012	Gillig	02/28/19	Oil leak, engine compartment, gasket between A/C compressor & hydraulic pump leaking
62643	2012	Gillig	02/28/19	Oil leak, engine compartment, oil coming out of oil filler tube (blow by)
62646	2012	Gillig	02/28/19	Oil leak, transmission, leaking from top

Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
62646	2012	Gillig	02/28/19	Oil leak, engine compartment, oil cooler leaking
62646	2012	Gillig	02/28/19	Oil leak, engine compartment, oil filler tube leaking @ block
62646	2012	Gillig	02/28/19	Oil leak, S/S engine compartment, oil pan leaking
62649	2012	Gillig	02/07/19	Tie rod end, @ pitman arm, worn
62649	2012	Gillig	02/07/19	Drag link, C/S end, worn
62649	2012	Gillig	02/07/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
62650	2012	Gillig	02/11/19	Brake shoes, S/S rear, worn below wear line
62650	2012	Gillig	02/11/19	Window shade, driver's side, broken (won't lock)
62650	2012	Gillig	02/11/19	Oil leak, engine compartment, timing chain cover leaking
63141	2007	Gillig	03/07/19	Compartment door, S/S rear, damaged
63141	2007	Gillig	03/07/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63141	2007	Gillig	03/07/19	Step well light, by #1 door, inop
63141	2007	Gillig	03/07/19	Overhead light, driver's compartment, inop
63142	2007	Gillig	01/14/19	Oil leak, engine compartment, alternator end plate leaking
63142	2007	Gillig	01/14/19	Radius rods, both rear upper, worn
63142	2007	Gillig	01/14/19	Radius rods, S/S rear lower, worn
63142	2007	Gillig	01/14/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63142	2007	Gillig	01/14/19	Oil leak, engine compartment, hydraulic fan motor leaking
63143	2007	Gillig	02/15/19	Wheelchair lift restraint, front, won't come down
63143	2007	Gillig	02/15/19	Oil leak, C/S rear, shock absorber leaking
63143	2007	Gillig	02/15/19	Dome lamps, S/S #2 & #5, inop
63149	2007	Gillig	02/28/19	Radius rods, both rear upper, worn
63149	2007	Gillig	02/28/19	Courtesy lights, by #3 & #4 doors, inop
63161	2008	Gillig	01/13/19	Dome lamp, C/S #5, inop
63161	2008	Gillig	01/13/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63161	2008	Gillig	01/13/19	Oil leak, engine compartment, hydraulic fan motor leaking
63161	2008	Gillig	01/13/19	Wheelchair ramp, front, won't deploy
63165	2008	Gillig	02/28/19	Air tanks, air system, full of water
63165	2008	Gillig	02/28/19	Dome lamps, C/S #1 #3 #4 #5 & S/S #5, inop
63165	2008	Gillig	02/28/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63165	2008	Gillig	02/28/19	Compartment door, C/S rear, damaged
63165	2008	Gillig	02/28/19	Oil leak, engine compartment, oil filler tube leaking
63190	2009	Gillig	02/17/19	Courtesy lamps, by #3 & #4 doors, inop
63190	2009	Gillig	02/17/19	Tire, S/S rear inner, worn
63190	2009	Gillig	02/17/19	Dome lamp, C/S #5, inop
63193	2009	Gillig	02/27/19	Oil leak, engine compartment, timing cover seal leaking
63193	2009	Gillig	02/27/19	Oil leak, engine compartment, oil leak between air compressor & hydraulic pump
63193	2009	Gillig	02/27/19	Oil leak, engine compartment, oil filler tube leaking @ block
63193	2009	Gillig	02/27/19	Wheelchair flip-up seats, C/S & S/S, won't lock in down position
63202	2010	Gillig	02/28/19	Dome lamp, S/S #1, inop

Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
63202	2010	Gillig	02/28/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63202	2010	Gillig	02/28/19	Coolant pipe bracket, engine compartment, broken (replaced by mechanic)
63202	2010	Gillig	02/28/19	Tires. C/S rear, worn (replaced by mechanic)
63202	2010	Gillig	02/28/19	Coolant leak, engine compartment, surge tank cap leaking
63203	2010	Gillig	03/05/19	Oil leak, engine compartment, oil pressure switch leaking
63205	2010	Gillig	02/06/19	King pin, S/S, worn
63205	2010	Gillig	02/06/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63206	2010	Gillig	03/05/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63206	2010	Gillig	03/05/19	Radius rods, both front upper, worn
63210	2010	Gillig	02/16/19	Oil leaks, engine compartment, multiple oil leaks (engine dirty)
63210	2010	Gillig	02/16/19	Windshield, S/S, large crack
63213	2010	Gillig	02/28/19	Oil leak, engine compartment, rear main seal leaking (engine dirty)

Note in the table above that several significant defects were found even when the last PMI occurred within a week of our inspection.

The average number of Class "A" defects per bus decreased this current audit when compared to the 2018 annual average number of Class "A" defects per bus and the audit results for the audits conducted February 9-11, 2019 and March 2-4, 2019, however, increased when compared to the annual averages for years 2014-2017.



Comfort and Convenience

During this audit, TRC found the interiors of buses to be kept clean.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the twenty-nine (29) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. ***Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects****. A review of inspector's qualifications and training is recommended.*

SUMMARY OF RECOMMENDATIONS

The total number of defects identified in this audit decreased when compared to the previous audit conducted March 2–4, 2019, however, is higher than all annual averages and the February 9–11, 2019 audit results. Eighty-one (81) Class "A" safety-related defects were found during this current audit, or 2.79 average Class "A" defects per bus compared to 3.80 average Class "A" defects per bus last audit. The average number of Class "A" defects per bus decreased this current audit when compared to the 2018 annual average number of Class "A" defects per bus and the audit results for the audits conducted February 9-11, 2019 and March 2-4, 2019, however, increased when compared to the annual averages for years 2014-2017. TRC cautioned that the improvements shown after the November 15, 2018 meeting would be sustainable only if a proper plan was put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- **TRC continues to recommend that the County establish a maximum defects-per-bus goal to hold Transdev accountable.**

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- Due to the numerous damaged curbside compartment door defects found during this current audit, TRC recommends that a road supervisor investigate the cause of these defects (i.e. obstacles at bus stops, etc.) or additional driver training be provided.

- TRC continues to recommend that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC continues to recommend a review of the number of buses that are unavailable for inspection during each audit. The current number of unavailable buses is unacceptable to maintain operations and meet daily pull-out.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.

APPENDIX A: Electronic copy of EXCEL spreadsheet reports

APPENDIX B:

Master Class "A" Defects

- Fire extinguisher
- Headlights
- Wipers
- Washers
- Cracked windshield in driver's view
- Seat belts, driver
- Turn signals
- Horn
- Emergency flashers
- Brake lights
- Air pressure/Air leaks
- Brake lining thickness @ _____
- Tire tread depth @ _____
- Fuel leak
- Exposed wires
- Proximity to exhaust – oil, harness, etc.
- Oil/Grease on Brakes
- Wheelchair lift/ramp & securement
- Sharp edges – interior
- Tripping hazard – interior
- Critical steering/suspension play, wear
- Sensitive edges – doors – not working at all
- Tire pressure below 80 psi
- Wheel lug nuts
- Exhaust leak into bus
- Back up alarm
- Excessive slack adjuster throw past _____
- Excessive oil in air system
- Missing battery label for shutoff
- Missing emergency exit signs
- Emergency window won't open

Prince George's County

Fleet Maintenance Audit

Inspection #76
Thirty (30) Buses

Conducted March 2 - 4, 2019

TRANSIT RESOURCE CENTER

5840 Red Bug Lake Road
Suite 165
Winter Springs, FL 32708
Phone: (407) 977-4500
Fax: (407) 977-7333
tranrc@earthlink.net

March 6, 2019

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty (30) Buses
Conducted March 2 - 4, 2019

TABLE OF CONTENTS

PRINCE GEORGE'S COUNTY
VEHICLE MAINTENANCE AUDIT
Thirty (30) Buses
Conducted March 2 - 4, 2019

EXECUTIVE SUMMARY

Transit Resource Center (TRC) was contracted by Prince George's County in 2014 to conduct bi-monthly vehicle maintenance audits to ensure that its contractor, Transdev, maintains buses owned by Prince George's County in accordance with its contract provisions. This report presents the findings of the maintenance audit conducted March 2 - 4, 2019 by TRC for Prince George's County. Forty-one (41) buses were scheduled for the fleet inspection and maintenance record review. In total, thirty (30) buses were inspected. Eleven (11) buses were not available for inspection due to the following reasons: Bus 62629/transmission, Bus 62639/engine, Bus 62652/engine, Bus 63092/wheelchair & A/C, Bus 63141/oil leak, Bus 63148, accident, Bus 63189/accident, Bus 63198/engine, Bus 63199/transmission, Bus 63210/windshield, and Bus 63212/engine. As with previous audits, *TRC is concerned about the high number of buses not available for inspection*. In this case, as with the previous audit, 27% of buses selected were not available for the various reasons listed above.

The results of this current audit are as follows:

Total Defects	135
Average Defects per Bus	4.50
Total Class "A" Safety-Related Defects	114
Average Class "A" Safety-Related Defects per Bus	3.80

The Audit Trend Comparison table found on Page 6 shows the audit results annual averages for years 2014-18, the audit results for the audit conducted February 9 – 11, 2019 and results for this current audit. Results from this current audit show an increase in both average number of defects per bus and average number of Class "A" defects per bus compared to the audit results from the previous audit and the annual averages.

TRC has voiced serious concerns about the deteriorating condition of the fleet. On November 15, 2018 Transdev, TRC, and County personnel met to discuss the status of the fleet and to prepare a plan of action. TRC previously reported a noticeable improvement in the condition of the fleet during subsequent December 2018 audits, but cautioned that it was too early to tell if the improvement was sustainable. The results of this current audit and the previous audit show a marked deterioration in the condition of the fleet. TRC does not have confidence in Transdev's corrective action and improvement plan.

As with previous audits, the "engine compartment" category remains the most significant area of concern. This single category accounted for more than 35% of all defects found. TRC continues to be concerned about the lack of progress in addressing engine compartment leaks and related defects.

Positive observations from this audit include the following:

- Transdev management and staff were cooperative and prepared in providing a constant supply of buses for TRC to inspect, thus, ensuring that the audit inspections were efficiently carried out;
- PMI records were well organized and easy to locate;
- All PMIs reviewed were conducted on schedule;
- Transdev immediately began repairs while the audit was being conducted;
- Transdev had replacement parts on hand to complete repairs.

Additional audit findings are presented in various tables located throughout this report. The tables are based on data contained in Excel spreadsheets included as a separate attachment in Appendix A of this report. A summary of recommendations is provided at the end of this report.

Audit Report

BUSES INSPECTED

Thirty (30) buses received a physical inspection during this audit. Table 1 below identifies these 30 buses.

Table 1
Buses Inspected

PHYSICAL INSPECTION	MODEL YEAR	VEHICLE MAKE	MOST RECENT PM
62617	2011	Gillig	01/30/19
62618	2012	Gillig	02/06/19
62619	2011	Gillig	02/28/19
62624	2011	Gillig	05/06/18
62630	2011	Gillig	02/12/19
62641	2012	Gillig	02/28/19
62644	2012	Gillig	02/07/19
62646	2012	Gillig	02/28/19
62651	2012	Gillig	02/11/19
63139	2007	Gillig	01/29/19
63140	2007	Gillig	02/21/19
63144	2007	Gillig	02/28/19
63146	2007	Gillig	02/14/19
63150	2007	Gillig	02/28/19
63160	2008	Gillig	02/28/19
63161	2008	Gillig	01/13/19
63162	2008	Gillig	01/17/19
63168	2008	Gillig	02/17/19
63188	2009	Gillig	02/17/19
63192	2010	Gillig	02/28/19
63195	2009	Gillig	02/28/19
63196	2010	Gillig	02/24/19
63200	2010	Gillig	02/28/19
63204	2010	Gillig	02/23/19
63205	2010	Gillig	02/06/19
63206	2010	Gillig	02/27/19
63208	2010	Gillig	01/27/19
63211	2010	Gillig	02/28/19
63214	2010	Gillig	10/12/18
63217	2010	Gillig	02/27/19

Table 2 which follows identifies the eleven buses that were not available for inspection. *TRC continues to be concerned about the high number of buses not available for inspection. Twenty-seven percent (27%) of buses selected for this audit were not available for inspection.*

Table 2
Buses Not Available for Inspection

BUSES NOT INSPECTED	MODEL YEAR	VEHICLE MAKE	REASON
62629	2011	Gillig	Transmission
62639*	2012	Gillig	Engine
62652	2012	Gillig	Engine
63092*	2006	Gillig	Wheelchair & A/C
63141	2007	Gillig	Oil leak
63148*	2007	Gillig	Accident
63189	2009	Gillig	Accident
63198*	2010	Gillig	Engine
63199	2010	Gillig	Transmission
63210	2010	Gillig	Windshield
63212	2010	Gillig	Engine

*Note: Bus has been unavailable for inspections for 3 months or longer

EVALUATION CRITERIA & METHODOLOGY

TRC assigned a team of four bus inspectors to perform the maintenance audit. The inspection team members were Mike Rakidjian, Jim Wilson, Sylvester Fikes, and Alusine Kanu. Sebastian Silvani served as the project manager, organized the overall inspection process, and prepared the final report.

The material which follows describes the evaluation criteria and methodology used by TRC to conduct the fleet inspection and the maintenance record review.

Fleet Inspection

All defects documented during the bus inspections were classified under one of 18 functional categories:

1) Accessibility Features
2) Air System/Brake System
3) Climate Control
4) Destination Signs
5) Differential
6) Driver's Controls
7) Electrical System
8) Engine Compartment
9) Exhaust
10) Exterior Body Condition
11) Interior Condition
12) Lights
13) Passenger Controls
14) Safety Equipment
15) Structure/Chassis/Fuel Tank
16) Suspension/Steering

17) Tires
18) Transmission

An "A/B" designation system was used to distinguish defects requiring immediate repair from those that could be repaired at a later time.

Class A – Indicates a safety-related defect that requires immediate repair and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Class "A" safety defects were discussed and agreed upon between Prince George's County and the TRC inspectors prior to the initial inspection and then revised after the second bi-monthly audit. A list of the Class "A" defects regarded as being safety related for this audit is attached as Appendix B. During the inspection, TRC provided Transdev and Prince George's County staff with copies of the defect lists for use in scheduling repairs. TRC inspectors also verified operation of certain controls to ensure that the defects were legitimate and not the result of the inspectors being unfamiliar with specific bus equipment.

Maintenance Record Review

The records examination set out to determine if:

- Preventive maintenance (PM) had been performed correctly and at prescribed intervals;

- Repairs had been performed properly and made promptly.

PM Intervals
To determine if preventive maintenance inspections (PMIs) were performed correctly and on time, TRC examined the PMI records of the thirty (30) buses that received a physical inspection during this audit. Mileage between the last three scheduled PMIs was calculated to determine if the inspections were performed on time (within 10% or 600 miles of the scheduled 6,000-mile interval) or if they were late.

Repairs
To determine if repairs were performed properly and made promptly, two audit procedures were used:

1) PMI sheets going back to the previous three PMIs were selected and examined for each of the thirty (30) buses to determine if and when defects defined during the PMI process were repaired.

2) Defects from the previous three PMIs were then compared to determine if any defects were repeated from one PMI to the next.

From this comparison, TRC determined if the defects were repaired or if they were simply noted on subsequent inspections.

FINDINGS

Overall Fleet Condition

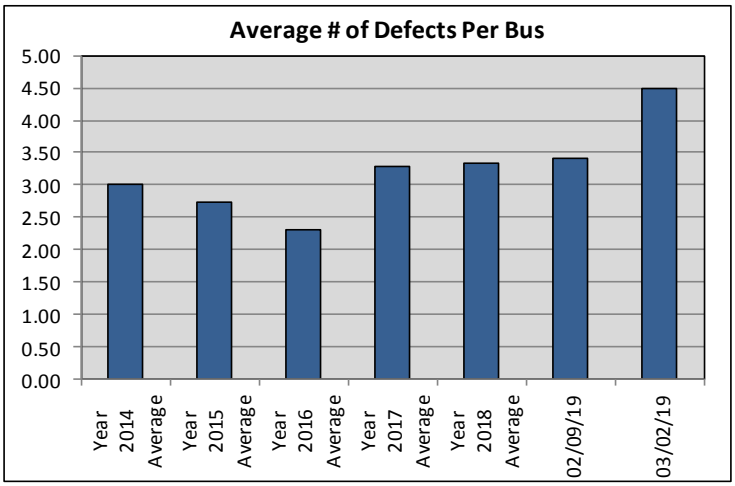
One hundred & thirty-five (135) defects were found during this current audit, or 4.50 average defects per bus. This is a significant increase over the previous audit conducted February 9–11, 2019 and is also higher than all other annual averages. TRC encourages the County to demand immediate action from Transdev to reverse this trend.

The Audit Trend Comparison table which follows shows the annual average number of defects per audit and the annual average number of defects per bus for the audits conducted in years 2014-18, the audit results for the audit conducted February 9-11, 2019 and the audit results of this current audit. Table 3 also shows the annual average number of Class "A" defects per audit and the annual average number of Class "A" defects per bus for years 2014-18, the audit results for the previous audit and the audit results for this current audit.

Table 3
Audit Trend Comparison

Date	Average Defects Per Audit	Average Defects per Bus	Average Class "A" Defects Per Audit	Average Class "A" Defects per Bus
Year 2014	126	3.00	62	1.48
Year 2015	98	2.72	74	2.06
Year 2016	74	2.31	59	1.84
Year 2017	105	3.28	88	2.75
Year 2018	97	3.34	85	2.93
Feb. 9 – 11, 2019	92	3.41	81	3.00
March 2 – 4, 2019	135	4.50	114	3.80

As shown in the table above and the chart which follows, the average number of defects per bus increased this current audit. The sharp increase is cause for concern, and the County must work with Transdev to develop a corrective action plan or enforce the agreement reached on November 15, 2018. As previously mentioned, TRC recommends that the County establish a realistic defect goal for Transdev to meet during these audits. Short term actions have proven ineffective in achieving lasting improvement.



Defects Findings

Defects were found in the Accessibility Features, Air System/Brake System, Destination Signs, Driver's Controls, Engine Compartment, Exterior Body Condition, Interior Condition, Lights, Passenger Controls, Safety Equipment, Suspension/Steering, and Transmission categories. The Engine Compartment remains as the primary concern, comprising over 35% of the total defects. **Engine compartment defects represent a critical fire risk.** The Suspension/Steering category defects decreased when compared to the previous audit and the annual audit averages, however, the Lights category, once again, experienced an increase when compared to the previous audit and all annual averages. This is concerning because it may represent lack of attention and care by the maintenance personnel to repair simple items. In addition, the Air System/Brake System category saw a sharp increase in the number of defects. Air System/Brake System defects present a critical safety and fire risk. An air system defect was identified as the probable root cause of a dragging brake and near-fire incident by Transdev.

The Summary of Defects by Category table below compares key performance indicators from this current audit to the average annual results and the results of the previous audit conducted February 9-11, 2019. A critical area of concern for this current audit continues to be in the Engine Compartment, Air System, and Lights which are highlighted in Table 4 below.

Table 4
Summary of Defect by Category

Summary of Defects by Category	Year 2014 Avg	Year 2015 Avg	Year 2016 Avg	Year 2017 Avg	Year 2018 Avg	Insp #75 Feb 2019	Insp #76 Mar 2019	
Accessibility Features	7	2	3	3	2	3	4	
Air System/Brake System	15	8	7	7	4	1	13	⇦
Climate Control	2	0	0	1	0	2	0	
Destination Signs	1	0	0	0	0	0	1	
Differential	1	1	1	1	0	0	0	
Driver's Controls	5	2	1	2	1	3	2	
Electrical System	2	1	1	1	0	0	0	
Engine Compartment	36	27	24	34	44	37	48	⇦
Exhaust	0	0	0	0	0	0	0	
Exterior Body Condition	15	18	12	12	13	9	16	
Interior Condition	13	13	4	10	2	2	16	
Lights	7	6	5	6	5	15	22	⇦
Passenger Controls	1	1	1	2	1	0	1	
Safety Equipment	7	4	1	1	0	0	2	
Structure/Chassis/ Fuel Tank	2	1	1	2	0	1	0	
Suspension/Steering	10	10	10	19	22	13	9	
Tires	3	1	3	2	2	2	0	
Transmission	2	2	2	1	2	4	1	
Total Defects	**126**	**98**	**74**	**105**	**97**	**92**	**135**	
Average Defects Per Bus	**3.00**	**2.72**	**2.31**	**3.28**	**3.34**	**3.41**	**4.50**	

PMI Paperwork Review Findings

TRC also performed a PMI paperwork review during each inspection cycle. During this audit, Transdev showed that the required PMI work was done on time, recorded properly, and within mileage requirements. *Although the PMI paperwork seems to be*

in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects. A review of inspector's qualifications and training is recommended.

For example, despite recent PM inspections that would have captured burned out light bulbs, multiple lights were found to be inoperable. Table 5 below lists the defects found in the Lights category. It is possible that the lights burned out after the PMI was completed, but more likely the lights were not repaired either due to parts shortages or lack of attention to detail. These minor defects (yet still a Class A defect) represent the lack of attention from the maintenance department that may lead to substantial safety lapses. **If simple defects are not detected and repaired, TRC has little confidence in Transdev's ability to identify and repair serious or complex issues**.

Table 5

Bus #	Last PMI	Class A "Lights" Defects
62618	02/06/19	Dome lamp, C/S #4 lamp, inop (repaired by mechanic)
62619	02/28/19	Courtesy light, by #2 door, inop (replaced by mechanic)
62619	02/28/19	Aisle lights, S/S rear, inop
62646	02/28/19	Courtesy lights, by rear doors, inop
63140	02/21/19	Strobe light, engine door, inop
63144	02/28/19	Dome lamp, S/S #5, inop
63144	02/28/19	Driver's lamp, driver's compartment, inop
63146	02/14/19	Step well lights, front & rear, all inop (replaced by mechanic)
63146	02/14/19	Dome lamp, S/S #1, inop (replaced by mechanic)
63150	02/28/19	Strobe light, engine door, inop
63160	02/28/19	Dome lamps, C/S #3 #4 & #5, inop
63161	01/13/19	Dome lamp, C/S #5 lamp, inop
63162	01/17/19	Dome lamps, C/S, all inop
63162	01/17/19	Dome lamps, S/S #1 & #4, inop
63168	02/17/19	Dome lamp, C/S #4, inop
63188	02/17/19	Dome lamps, C/S, all inop
63192	02/28/19	Dome lamps, C/S #3 #4 & #5, inop
63192	02/28/19	Dome lamp, S/S #1 lamp, inop
63195	02/28/19	Dome lamp, S/S #5, inop
63208	01/27/19	Courtesy lights, rear doors, inop
63211	02/28/19	Dome lamp, C/S #4, inop
63217	02/27/19	Lamps, interior & exterior front door, inop

Specific Defect Summaries

All of the defects identified during the inspections were entered in a database which was used to generate a Master Defect Sheet. Data contained in that spreadsheet were then used to produce a series of detailed Excel reports.

The following Excel spreadsheets produced by TRC for Prince George's County are included as an attachment to this report:

- **Defects Summary:** includes a summary of defect totals and a summary of the 18 defect categories
- **Year-to-Year Defects Summary:** includes a year-to-year summary of defect totals and a year-to-year summary of the 18 defect categories

- **All Defects (Master Defect Sheet):** identifies all defects for all buses inspected
- **Defects by Category:** identifies specific defects under each of the 18 categories
- **"A" Defects:** identifies all Class "A" defects
- **"A" Defects by Category:** identifies specific "A" defects under each of the 18 categories
- **"B" Defects:** identifies all Class "B" defects
- **"B" Defects by Category:** identifies specific "B" defects under each of the 18 categories
- **Buses Inspected:** lists all buses inspected

As mentioned earlier, each defect was classified based on U.S. DOT standards as noted below:

Class A – Indicates a safety-related defect that requires immediate removal from service and keeps the vehicle from returning to revenue service until the defect is corrected.

Class B – Indicates a non-safety critical defect that requires attention during the next scheduled preventive maintenance service interval.

Defect Analysis

Defects identified by TRC were analyzed to determine the severity or detrimental impact they pose in terms of safety, comfort and convenience, and structural integrity.

Safety

One hundred & fourteen (114) Class "A" safety-related defects were found during this inspection, for an average of 3.80 Class "A" safety-related defects per bus compared to 3.00 average Class "A" safety-related defects the previous audit. The 114 Class "A" defects found during this current audit are listed in Table 6 which follows.

Table 6

Bus #	Year	Make	Last PMI	Class "A" Defects
62617	2011	Gillig	01/30/19	Wheel rim, C/S rear outer wheel, damaged (bent) / repaired by mechanic
62617	2011	Gillig	01/30/19	Oil leak, engine compartment, multiple oil leaks
62618	2012	Gillig	02/06/19	Oil leak, engine compartment, alternator front seal leaking
62618	2012	Gillig	02/06/19	Oil leak, engine compartment, oil cooler gasket leaking
62618	2012	Gillig	02/06/19	Dome lamp, C/S #4 lamp, inop (repaired by mechanic)
62618	2012	Gillig	02/06/19	Check engine light, dash, check engine light on
62618	2012	Gillig	02/06/19	Flooring, on hatch, coming up / trip hazard
62619	2011	Gillig	02/28/19	A/C belt, engine compartment, cracked (replaced by mechanic)
62619	2011	Gillig	02/28/19	Alternator belt, engine compartment, cracked (replaced by mechanic)

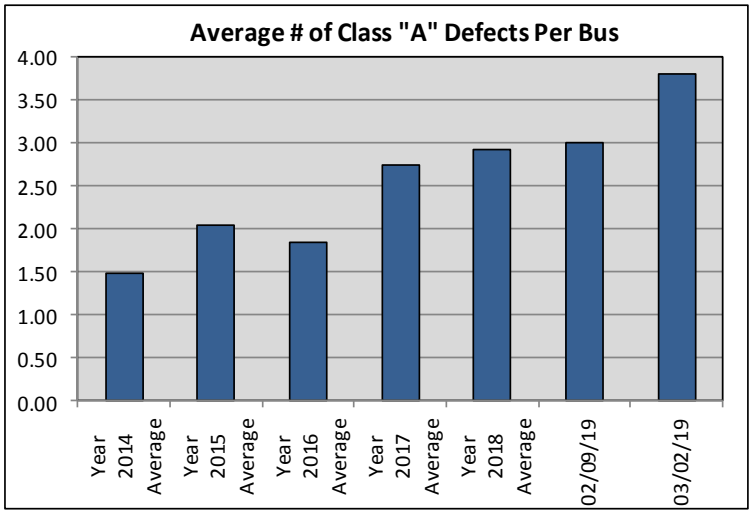
Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
62619	2011	Gillig	02/28/19	Courtesy light, by #2 door, inop (replaced by mechanic)
62619	2011	Gillig	02/28/19	Oil leak, S/S rear, shock absorber leaking
62619	2011	Gillig	02/28/19	Oil leak, engine compartment, rear main seal leaking
62619	2011	Gillig	02/28/19	Flooring, around hatch, coming up / trip hazard
62619	2011	Gillig	02/28/19	Aisle lights, S/S rear, inop
62624	2011	Gillig	05/06/18	Alternator belt, engine compartment, cracked
62624	2011	Gillig	05/06/18	Oil leak, engine compartment, oil filler tube leaking
62624	2011	Gillig	05/06/18	Flooring, front yellow strip, coming up / trip hazard
62630	2011	Gillig	02/12/19	Brake shoes, front, worn to wear line
62630	2011	Gillig	02/12/19	Oil leak, engine compartment, oil filler tube leaking at block
62630	2011	Gillig	02/12/19	Oil leak, engine compartment, rear main seal leaking
62630	2011	Gillig	02/12/19	A/C bolt, engine compartment, cracked (replaced by mechanic)
62641	2012	Gillig	02/28/19	ABS light, dash, ABS light on
62641	2012	Gillig	02/28/19	Check engine light, dash, check engine light on
62641	2012	Gillig	02/28/19	Oil leaks, engine compartment, multiple oil leaks / engine dirty
62641	2012	Gillig	02/28/19	Coolant pipe bracket, engine compartment, broken
62641	2012	Gillig	02/28/19	Slack adjuster, C/S rear, won't take adjustment
62641	2012	Gillig	02/28/19	Flooring, around hatch, coming up / trip hazard
62641	2012	Gillig	02/28/19	Seat, C/S rear, corner broken (sharp edges)
62644	2012	Gillig	02/07/19	Oil leak, engine compartment, rear main seal leaking
62644	2012	Gillig	02/07/19	Radius rod, S/S rear lower, worn
62644	2012	Gillig	02/07/19	Oil leak, engine compartment, alternator gasket leaking
62646	2012	Gillig	02/28/19	King pins, both, worn
62646	2012	Gillig	02/28/19	Courtesy lights, by rear doors, inop
62651	2012	Gillig	02/11/19	Radius rod, C/S rear lower, worn
62651	2012	Gillig	02/11/19	ABS light, dash, ABS light on
62651	2012	Gillig	02/11/19	Traction control light, dash, traction control light on
62651	2012	Gillig	02/11/19	Emergency exit window, S/S #3, cracked
63139	2007	Gillig	01/29/19	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63139	2007	Gillig	01/29/19	Air leak, under bus, air dryer gasket leaking
63139	2007	Gillig	01/29/19	ABS light, dash, ABS light on
63140	2007	Gillig	02/21/19	ABS light, dash, ABS light on
63140	2007	Gillig	02/21/19	Check engine light, dash, check engine light on
63140	2007	Gillig	02/21/19	Strobe light, engine door, inop
63140	2007	Gillig	02/21/19	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63144	2007	Gillig	02/28/19	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63144	2007	Gillig	02/28/19	Check engine light, dash, check engine light on
63144	2007	Gillig	02/28/19	ABS light, dash, ABS light on
63144	2007	Gillig	02/28/19	Traction control light, dash, traction control light on
63144	2007	Gillig	02/28/19	Dome lamp, S/S #5, inop
63144	2007	Gillig	02/28/19	Driver's lamp, driver's compartment, inop
63144	2007	Gillig	02/28/19	Wheelchair lift, front, very slow
63146	2007	Gillig	02/14/19	A/C belt, engine compartment, cracked (replaced by mechanic)
63146	2007	Gillig	02/14/19	Step well lights, front & rear, all inop (replaced by mechanic)

Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
63146	2007	Gillig	02/14/19	Oil leak, engine compartment, hydraulic fan motor leaking
63146	2007	Gillig	02/14/19	Oil leak, engine compartment, oil filler tube leaking at block
63146	2007	Gillig	02/14/19	Ground strap, engine compartment, broken
63146	2007	Gillig	02/14/19	Oil leak, S/S rear, shock absorber leaking (replaced by mechanic)
63146	2007	Gillig	02/14/19	Dome lamp, S/S #1, inop (replaced by mechanic)
63150	2007	Gillig	02/28/19	Route sign, rear, scrambled
63150	2007	Gillig	02/28/19	Wheelchair lift, front, inop
63150	2007	Gillig	02/28/19	ABS light, dash, ABS light on
63150	2007	Gillig	02/28/19	Strobe light, engine door, inop
63160	2008	Gillig	02/28/19	Radius rod, S/S rear lower, worn
63160	2008	Gillig	02/28/19	Dome lamps, C/S #3 #4 & #5, inop
63161	2008	Gillig	01/13/19	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63161	2008	Gillig	01/13/19	Dome lamp, C/S #5 lamp, inop
63161	2008	Gillig	01/13/19	Flooring, around hatch, coming up / trip hazard
63162	2008	Gillig	01/17/19	Oil leak, engine compartment, oil pressure switch leaking
63162	2008	Gillig	01/17/19	Dome lamps, C/S, all inop
63162	2008	Gillig	01/17/19	Dome lamps, S/S #1 & #4, inop
63168	2008	Gillig	02/17/19	Oil leak, engine compartment, alternator seal leaking
63168	2008	Gillig	02/17/19	Oil leak, engine compartment, timing chain cover leaking
63168	2008	Gillig	02/17/19	Dome lamp, C/S #4, inop
63168	2008	Gillig	02/17/19	Stop request sign, front, inop
63188	2009	Gillig	02/17/19	Oil leak, engine compartment, oil cooler leaking
63188	2009	Gillig	02/17/19	Oil leak, engine compartment, rear main seal leaking
63188	2009	Gillig	02/17/19	A/C belt, engine compartment, cracked (replaced by mechanic)
63188	2009	Gillig	02/17/19	Dome lamps, C/S, all inop
63192	2010	Gillig	02/28/19	Dome lamps, C/S #3 #4 & #5, inop
63192	2010	Gillig	02/28/19	Flooring, by floor hatch, cracked (coming up) / trip hazard
63192	2010	Gillig	02/28/19	Dome lamp, S/S #1 lamp, inop
63192	2010	Gillig	02/28/19	Shock bushing, C/S rear, worn
63192	2010	Gillig	02/28/19	Heater control knob, dash, missing
63195	2009	Gillig	02/28/19	Oil leak, engine compartment, hydraulic fan motor leaking
63195	2009	Gillig	02/28/19	Oil leak, engine compartment, gasket leaking between air compressor & hydraulic pump
63195	2009	Gillig	02/28/19	Egress window, S/S #3, hard to open & latch won't lock
63195	2009	Gillig	02/28/19	Dome lamp, S/S #5, inop
63196	2010	Gillig	02/24/19	Oil leak, engine compartment, hydraulic fan motor leaking
63196	2010	Gillig	02/24/19	Oil leak, engine compartment, gasket leaking between air compressor & hydraulic pump
63196	2010	Gillig	02/24/19	Oil leak, engine compartment, rear main seal leaking
63196	2010	Gillig	02/24/19	Oil leak, steering, gear box leaking
63200	2010	Gillig	02/28/19	Flooring, by floor hatch, piece missing & coming up / trip hazard
63205	2010	Gillig	02/06/19	A/C belt, engine compartment, cracked

Table 6				
Bus #	**Year**	**Make**	**Last PMI**	**Class "A" Defects**
63205	2010	Gillig	02/06/19	Alternator belt, engine compartment, cracked
63205	2010	Gillig	02/06/19	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63205	2010	Gillig	02/06/19	Oil leak, engine compartment, alternator end plate leaking
63205	2010	Gillig	02/06/19	Flooring, around hatch, coming up / trip hazard
63206	2010	Gillig	02/27/19	Oil leak, engine compartment, crankcase breather box leaking
63206	2010	Gillig	02/27/19	Flooring, around hatch, coming up / trip hazard
63208	2010	Gillig	01/27/19	A/C belt, engine compartment, cracked
63208	2010	Gillig	01/27/19	Oil leak, engine compartment, alternator end plate leaking
63208	2010	Gillig	01/27/19	Courtesy lights, rear doors, inop
63208	2010	Gillig	01/27/19	Oil leak, engine compartment, oil cooler line leaking
63208	2010	Gillig	01/27/19	ABS light, dash, ABS light on
63208	2010	Gillig	01/27/19	Wheelchair ramp, front, inop
63211	2010	Gillig	02/28/19	ABS light, dash, ABS light on
63211	2010	Gillig	02/28/19	Oil leaks, engine compartment, multiple oil leaks / engine dirty
63211	2010	Gillig	02/28/19	Dome lamp, C/S #4, inop
63214	2010	Gillig	10/12/18	Wheelchair ramp, front, inop
63214	2010	Gillig	10/12/18	Low hydraulic fluid light, dash, how hdraulic fluid light on
63217	2010	Gillig	02/27/19	Lamps, interior & exterior front door, inop
63217	2010	Gillig	02/27/19	King pins, both, worn
63217	2010	Gillig	02/27/19	Oil leak, engine compartment, oil filler tube leaking
63217	2010	Gillig	02/27/19	Oil leak, engine compartment, rear main seal leaking

Note in the table above that several significant defects were found even when the last PMI occurred within a week of our inspection.

The average number of Class "A" defects per bus increased during this current audit when compared to the annual average number of Class "A" defects per bus for the audits conducted in 2014-18 and the audit results for the previous audit conducted February 9-11, 2019. <u>This substantial increase in Class "A" defects requires immediate attention by the County and Transdev to reverse the trend.</u>



Comfort and Convenience
During this audit, TRC found the interiors and exteriors of buses to be kept clean.

Structural Integrity
TRC did not observe any structural defects during this audit.

PMI Schedule Adherence

TRC examined the PMI records of the thirty (30) buses that received a physical inspection to determine if the PMIs were being done at scheduled 6,000-mile intervals. PMI intervals were considered "on time" if performed on or before 6,600 miles ("late window" of 10% or 600 miles). The on-time adherence to preventive maintenance inspections (PMIs) scheduled at 6,000-mile intervals was within required guidelines for all buses inspected during this audit.

TRC also inspected the PMI paperwork to check on defects found and the results that followed. A review was made to verify that problems were corrected by either repair or replacement of components. Mike Rakidjian reviewed the PMI paperwork. This review showed that the Transdev crew correctly repaired or replaced items that were found defective during Transdev's PMI efforts. ***Although the PMI paperwork seems to be in order, TRC is concerned that inspections conducted by Transdev employees are not actually capturing defects****. A review of inspector's qualifications and training is recommended.*

SUMMARY OF RECOMMENDATIONS

The number of defects identified in this audit increased sharply from the last audit and is higher than all annual averages previously recorded. One hundred & fourteen (114) Class "A" safety-related defects were found during this current audit, or 3.80 average Class "A" defects per bus compared to 3.00 average Class "A" defects per bus last audit. TRC cautioned that the improvements shown after the November 15, 2018 meeting would be sustainable only if a proper plan was put in place. Further corrective action and intervention by the County is again recommended.

- TRC continues to recommend that Prince George's County work with Transdev to immediately develop a long-term resolution to decrease and maintain an acceptable number of safety-related defects.

- **TRC recommends that the County establish a maximum defects-per-bus goal to hold Transdev accountable.**

- TRC continues to recommend that Prince George's County and Transdev review all engine compartment defects and prepare a strategic plan to address these defects. Poor engine compartment maintenance, including fluid leaks, greatly increases fire risk.

- TRC recommends that buses that have been out of service for an extended period of time be repaired immediately or disposed of to get them 'off the books'.

- TRC recommends a review of the number of buses that are unavailable for inspection during each audit. The current number of unavailable buses is unacceptable to maintain operations and meet daily pull-out.

- TRC continues to recommend a review of the training and qualifications of Transdev technicians performing preventive maintenance inspections (PMI). In addition, maintenance must reinforce the importance of identifying and repairing simple defects. The discrepancy between correct PMI paperwork and audit findings suggests a possible training issue or lack of attention.