

CULVER CITY MUNICIPAL BUS LINES EQUIPMENT MAINTENANCE PLAN

January 2017



Culver CITY

TRANSPORTATION DEPARTMENT
Equipment Maintenance & Fleet Services Division

4343 Duquesne Avenue
Culver City, California 90232

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TRANSPORTATION DEPARTMENT

Culver City Municipal Bus Lines

Equipment Maintenance Plan

I. OVERVIEW

The Equipment Maintenance and Fleet Services Division (hereinafter referred to as “The Division”) of the City of Culver City’s Transportation Department is the provider of service for equipment maintenance and repair services for the Culver City Municipal Bus fleet (Culver CityBus).

All maintenance procedures are conducted at the Culver City Transportation Facility, which is located at 4343 Duquesne Avenue, at the corner of Jefferson Boulevard in the City of Culver City. Maintenance facilities consist of: an enclosed two-story building with eight (8) bays, four (4) of which are dedicated to bus maintenance; a separate welding/fabrication shop, a machine shop; a tire shop; and, a farebox repair room and a battery repair room.

Information about the maintenance facility can be found in the Culver City Transportation Department’s Facility Maintenance Plan.

The Culver CityBus fleet is comprised of 54 (fifty-four) low-floor, heavy duty buses. Fifty-two, forty-foot buses and two (2), thirty-foot buses, all 100% fueled by compressed natural gas (CNG). Dedicated CNG fueling facilities are on-site at the Culver City Transportation Facility, where the buses are also parked when not operating in revenue service. Transit Operations has ten support vehicles, of which eight operate on CNG, and are also maintained and stored on-site when not in use.

The Equipment Maintenance & Fleet Services Division was selected as the Number One (1st) Best Fleet in North America for 2013 out of 38,000 public fleets, within a comprehensive and competitive fleet certification program. The Division was also named the #1 Best Green Fleet in North America in 2009. For 2014, the Fleet was awarded with the prestigious “Elite Fleet Award” by Government Fleet Magazine. Only four municipal fleets since 2004 have achieved this status (from 38,000 public fleets).

II. STRATEGIC MANAGEMENT PLAN

OBJECTIVE: To provide the organizational structure that optimizes physical and human resources, and to encourage proactive, fiscally responsible management of equipment maintenance operations and related programs.

A. Asset Management

The Culver City Transportation Department fully complies with the federal procurement regulations regarding the disposition of revenue assets. Fixed asset data for in-service date, out-of-service date, mileage and grant funding information is identified in the asset management system. The grant identification related to the asset is also included in the vehicle information document.

B. Organization

The Culver City Transportation Department is operated under a Strategic Plan, which incorporates Fiscal and Operational Goals and Objectives, Work and Action Plans, Program Development Initiatives and Personnel Training and Development Programs to optimize efficiency at all levels of operation. The Transportation Director provides development and operational oversight to the Department and the Division.

The Equipment Maintenance & Fleet Services Division Manager provides operational support for implementation of work and action plans for repair and maintenance of all City-owned vehicles at the facility. All levels of management contribute to personnel and program development, which supports and facilitates achievement of the goals and objectives for the Division.

Transit maintenance operations is supervised by one Equipment Maintenance Supervisor supported by other Equipment Maintenance Supervisors, as necessary. The City Bus fleet is maintained by six (6) Sr. Fleet Services Technicians, one (1) Electronic Fleet Services Technician, one (1) Fleet Services Technician, and seven (7) Fleet Services Assistants, and one (1) Maintenance Custodian. Employee work shifts actively cover maintenance operations 22.5 hours per day, 7 days per week, 365 days per year, to ensure maximum efficiency and reduced vehicle downtime.

C. Financial Management

Fiscal responsibility for the maintenance of the Culver CityBus fleet is held by the Transportation Department, and administered through monthly billing reports for maintenance, repair and fuel usage created by the Division.

The Culver City City Council holds primary fiscal responsibility for budget and expenditures, supported by a municipal budgeting process. Council must authorize any vendor contracts which exceed \$30,000.

D. Quality Control

All maintenance operations fall under the parameters of City, County, State and Federal quality control requirements for operational safety, effectiveness and environmental compliance. Management implements a proactive approach to monitoring and adhering to these requirements through programs that will be referenced in subsequent sections of this document.

The Equipment Maintenance & Fleet Services Division is certified as a Green Model Shop under the State of California's Department of Toxic Substance & Control (DTSC) Green Model Shop Program.

III. EQUIPMENT MAINTENANCE

OBJECTIVE: To provide ongoing, quality maintenance of the Culver CityBus fleet and support vehicles by integrating preventative maintenance with proactive response to unscheduled repairs to ensure maximum vehicle longevity, and to maintain compliance with all local, state and federal operational requirements.

A. Preventative Maintenance

The Equipment Maintenance and Fleet Services Division implements an aggressive and proactive Preventative Maintenance (PM) program for all of the vehicles and equipment for which it is responsible. Please refer to the bus manufacturer preventative maintenance (PM) Checklist (Appendix A) which includes our statutory California Highway Patrol (CHP) Bus Maintenance & Safety Inspections. These documents are included herein for detailed listings of these PM activities.

Preventative maintenance work is scheduled at 90-day/7,500-mile (whichever occurs first) intervals, progressing to major service and inspections at 30,000-mile intervals. In some cases the preventative maintenance intervals may vary by sub-fleet. Inspections that are no later than ten (10%) percent over the 90 day schedule or do that do not exceed 8,250 miles are considered to be on time. These intervals are monitored and administered through the Division's AssetWorks Fleet Management (FA) computer software system. All transit bus engines that are within manufacturers' warranty periods shall not exceed 7,500 mile intervals.

The City of Culver City Equipment Maintenance Division uses specially blended synthetic motor oil designed for natural gas engines, and a new specific lifetime oil filter (Pure Power Filter) which greatly augments the oil's ability to lubricate and clean engines and transmissions. Consequently, the Division has extended the drain intervals from 6,000 miles to 7,500 miles. Engines out of warranty are maintained on a prescribed 7,500 mile preventative maintenance schedule as outlined above.

All transit buses undergo daily servicing that includes re-fueling for Compressed Natural Gas (CNG), safety inspections, vehicle lighting maintenance and repairs, tire inspections and replacements, engine fluid replenishment, ADA equipment inspections and/or repairs, removal of farebox revenues, and thorough interior and exterior cleaning, which also includes graffiti removal and complete vehicle washing. To ensure the effectiveness of current maintenance practices, the following items are monitored regularly:

- System/Component failures
- Fuel consumption
- Vehicle downtime
- Appropriate spare parts inventory
- On the road failures (road calls)
- Labor hours expended for repairs
- Farebox integrity
- AVL and Security Camera systems
- Safe operation of the vehicle

Engine oil is synthetic for maximum durability, and changed every seven thousand five hundred miles (7,500). In addition, air filters are equipped with a special sensor to indicate the need for replacement. Engine oil, transmission fluid levels, and tire pressures are checked daily.

A significant element of preventative maintenance is the engine oil and transmission fluid analysis which is regularly performed by Chevron through our current oil/lubricants supplier. Samples are taken at the 15,000 mile PM interval, or as needed.

All revenue vehicles are on a prescribed 90-Day/7,500 mile inspection and repair interval which is incorporated into our PM program documentation and includes the following safety systems:

- Vehicle safety systems
- Emergency/parking brake
- Brake interlock
- Tires (air pressure and tire wear)
- Interior and exterior lighting
- Batteries (clean and inspect)
- Turning signals/vehicle lights

- Feather edges
- Engine/chassis steam cleaning
- Windshield wiper blades
- Wheelchair/Ramp deployment inspection
- Windows – checks for cracks and breakage
- Air tank drainage
- CNG Fuel tanks and system inspection
- Review of the CHP/Service inspection cards
- All safety systems

All preventative maintenance and repair work orders are created and entered into the Fleet Management system, delineating costs for labor, parts and commercial charges, which are all reviewed for detail and accuracy.

All records associated with preventative maintenance and repair service are maintained onsite at the facility.

B. Warranty Recovery Program

The Culver CityBus fleet (at date of publication) operates vehicles and equipment that are under warranty by original equipment manufacturers. The PM program identified above, and the resultant PM activity performed on all fleet equipment, meets or exceeds the manufacturers' recommendations for preventative maintenance and repair.

The Division identifies, records, and enforces warranty claims against equipment manufacturers to ensure that the cost of defects is borne by the manufacturers, and not by the Culver City Transportation Department or the Federal Transit Administration (FTA). Records associated with warranty recovery are maintained at the facility site.

C. Americans with Disabilities Act (ADA) Maintenance

The Department of Transportation (DOT) Americans with Disabilities Act (ADA) regulations require that all vehicle accessibility features, such as the wheelchair lift, ramps, securing devices, signs and communication equipment for persons with disabilities, be maintained and operational.

The Division has incorporated these ADA maintenance elements into the regular preventative maintenance and inspection plans, and has identified these elements on PM checklists (Appendix A). Buses on which ADA equipment is found to be in need of repair, adjustment or replacement are withheld from revenue service until the repair or replacement is conducted. Records associated with these functions are maintained at the facility site.

D. Bus Tire Lease

Culver CityBus leases its bus tires through the Goodyear Tire & Rubber Company. This contract currently saves over \$80,000 annually. In-house Fleet Services Assistants perform the daily inspections and all necessary maintenance on these leased tires including regrooving, balancing and mounting/dismounting of bus tires. Tire inventory and mileage reports are provided to Goodyear on a monthly basis. Goodyear provides monthly inspections of the transit bus fleet's tires and records their condition which is provided to the Division.

E. Post-Accident Inspections and Procedures

The Division records, reviews, tracks, and administers the procedure for accidents and incidents occurring to the Culver City Bus assets. Post-accident inspections are conducted on the scene of the accident, as well as in the shop when the vehicle has been returned to the facility.

The accident work order is created and entered into the Fleet Management system, delineating costs for labor, parts and commercial charges, which are all reviewed for detail and accuracy. Claims are filed through the City Attorney's Office, as necessary, to recapture costs for repair to damage that are deemed to be the responsibility of the opposing party. Transit Operations performs accident investigations whereby pictures are taken and a report of the incident is developed and retained as part of a permanent record for the vehicle. The Equipment Maintenance Division maintains accident costs and recovery documentation.

Appendix A – Preventative Maintenance (PM) Checklist

PM requirements:

PMA @ 7,500 miles or 90 Days - Minimum @ 6,750 miles; Maximum @ 8,250 miles

PMB @ 15,000 miles

FLEET:

SR757 -2001 C40LF (12)

SR866 -2003 C30LF (2)

SR962 -2004 C40LF (8)

SR1297 -2009 C40LF BRT (6)

SR1551 -2012 XN40 BRT (4)

SR1595 -2012 XN40 (16)

SR1810 -2014 XN40 (4)

SR1816 -2014 XN40 (2)

SR2051 -2016 XN40 (Pending Delivery of 18 in CY17)

ITEM #	Type PM	TASK	Action Code	COMMENTS
A.		<i>Pre-Maintenance Records Review</i>		
	A	Review Maintenance Records and Daily Bus Inspection Sheets (DBI). List all deferred (backlogged) repairs still pending for this bus on the cover sheet of this PM. Complete these repairs along with this PM.		
B.		<i>Exterior Visual Inspection</i>		
	A & C	Turn Master Run Switch to "Night Run" position. Start engine. Engage fast idle. Activate rear door interlock. Activate both turn signal foot switches at the same time. Walk around outside the bus and check the condition/operation of the following:		
1	A & C	Headlights. Also engage and check high beams.		
2		All Flashers.		
3	A & C	Marker Lights, including License Plate Light, Turn Signal Lights.		
4	A & C	Brake/Tail & Reverse Lights, Reverse Audible Alarm (Beeper).		
		Shut down the engine. Continue exterior visual inspection as follows:		
5	A & C	Windshields (Cracks, Breaks, Graffiti, General Condition).		
6	A & C	Wiper Blades/Arms.		
7	A & C	Destination Signs: Front, Side, Rear. (Turn on Power, Observe Operation).		
8	A & C	Exterior Mirrors. (Also Check R/H for Remote Control Adjustability).		
9	A	Bumpers.		
10	A & C	License Plates/Brackets.		
ITEM #	Type PM	TASK	Action Code	COMMENTS
11	A & C	Paint/Decals/Outside Glass.		
12	A & C	Wheels/Lugs.		
13	A & C	Body Damage (Incl. CNG Tank Shrouds on Roof).		
14	A & C	Check Ground Under Bus for Fluid Leaks. Note location/source of leaks.		
C.		<i>Interior Visual Inspection (Driver's Area)</i>		

		Check the condition/operation of the following:		
1	A & C	Registration Certificate on Panel Behind Driver.		
2	A & C	Headsign Code (Route) Sheet on Panel Behind Driver.		
3	A & C	Driver's Storage Compartment & Plexiglas Access Door. (Directly behind Driver's Seat).		
4	A	Lock Box (On Top of Left Wheel Well Housing).		
5	A & C	Steering Wheel Tilt and Telescopic Features.		
6	A & C	Turn Steering Wheel, Check for Binding.		
7	A & C	Check Steering Wheel Free Play (2.75" Max.)		Note Freeplay: _____ Inches.
8	A	Driver's Seat. Seat Controls. Seat Belt.		
9	A & C	Sun Visors.		
10	A & C	Dash Lights, Speedometer and Gauges.		
11	A	Dash Knobs and Switches (Incl. Side Dash Panel).		
12	A & C	Evidence of Fluid/Water Leaks.		
13	A & C	Driver's Defroster Control Knobs.		
14	A & C	Wiper Blade Control Knobs.		
15	A	Farebox, BVU, OCU.		
16	A	Transfer Cutters.		
17	A & C	Foot Switches (Headlight Dimmer, R&L Turn Signals, Public Address).		
ITEM #	Type PM	TASK	Action Code	COMMENTS
18	A & C	Operate Windshield Wipers. Observe Operation.		
19	A & C	Defroster Operation.		
20	A & C	Heater Controls/Operation.		
21	A & C	Kneeling Operation. Cycle at Least Twice. Listen for Beeper.		
22	A & C	Wheelchair Ramp Operation. Cycle at Least twice. Listen for Beeper.		
23	A & C	Wheelchair Ramp Hydraulic Fluid Level. Check for Leaks.		
24	A & C	Check Radio Operation with Dispatcher.		
25	A & C	Public Address System (Incl. Microphone and all Speakers).		
26	A & C	Destination Sign Controls.		
27	A	Destination Sign Access Door/Locks.		

28	A & C	Front Door Operation. (Also, Check Emergency Manual Door Controls).		Note Open/Close Time: Open: Close:
29	A & C	Rear Door Operation. Rear Door Touch Tape. (Also, Check Sensitive Edges and Emergency Manual Door Controls).		Note Open/Close Time. Open: Close:
30	A & C	Rear Door Indicator Light.		
31	A & C	Accelerator Pedal Operation (Check Wobble, Binding or Sticking).		
32	A & C	Brake Pedal Operation (Check Wobble, Binding or Sticking).		
D.		<i>Interior Visual Inspection (Passenger Area)</i>		
		Check the Condition/Operation of the following:		
1	A & C	Dome (Aisle) Lights and Step Lights.		
2	A & C	Passenger Signal System (Stop Request Signs, Pull Cords, Touch Tapes).		
ITEM #	Type PM	TASK	Action Code	COMMENTS
3	A	Passenger Seats, Seat Inserts. Check for Cuts, Graffiti, etc.		
4	A	Walls, Bulkheads. Check for Damage, Graffiti, Excessive Dirt, etc.		
5	A	Windows, Window Graffiti Shields, Brackets. (If Shields Badly etched, Replace).		
6	A & C	Stanchions, Grab Straps, Modesty Panels.		
7	A & C	Emergency Windows, Roof Exits.		
8	A	Condition of Floor, Stainless Steel Kick Panels. (Check for Excessive Dirt, etc.)		
9	A	Rear Seat Firewall Engine Access Cover, Bolts, Insulation. Secure?		
10	A	PLC Compartment Above Rear Seats. Secure?		
11	A	All Panels and Interior Trim. Tighten/Replace Loose/Missing Screws.		
12	A	Condition of Miscellaneous Interior Decals.		
13	A	Evidence of Rain Water Leaks.		
14	A	Interior Mirrors. Secure? Adjustability?		
15	A,B&C	Wheelchair locks, seat belts, folding seats, stop request touch tape.		
16	A & C	Inventory Emergency Reflector Triangles (Should be 3). Box is mounted on curbside front wheel well.		
17	A & C	Inspect Fire Extinguisher for Complete Charge. Mounted next to reflectors.		

18	A	Inspect Route Map Holder. Mounted next to reflectors.		
ITEM #	Type PM	TASK	Action Code	COMMENTS
E.		<i>Pre-Work Bay Test Drive</i>		
		Test Drive the Bus. Check the following:		
1	A	Check for Normal Acceleration.		
2	A	Check Brake Operation.		
3	A	Check for Proper Transmission Retarder Operation.		
4	A	Note Any Suspension Noise.		
5	A & C	Low Air Alarm-Buzzer, Dash Indicator Light. Alarm on at 65 PSI, Off at 85 PSI.		
6	A & C	Parking Brake Operation: Apply and release foot brake pedal once every second until driver's pop-off valve activates. Pop-off valve should activate at approx. 60 PSI.		
7	A & C	Set Parking Brake, Engage Fast Idle.		
8		Air Compressor Buildup Time. 80-100 PSI in Maximum of 45 Seconds.		
9	A & C	Governor Cut-In Pressure: 95 PSI Minimum. Cut-Out Pressure: 130 PSI Maximum.		
10	A	Release Parking Brake.		
11	A	When Governed Pressure is Reached, Shut Off Engine.		
12	A & C	With Brakes Released, Perform Static Air Loss Test for 1 Minute. After Pressure Gauge Needles Have Stabilized, Note Air Loss. (2 Lbs. Maximum Air Loss).		
13	A & C	Perform Dynamic Air Loss Test for 1 Minute. Note Air Loss. (2 Lbs. Maximum Air Loss).		
ITEM #	Type PM	TASK	Action Code	COMMENTS
14	A & C	With Engine Off, Parking Brake Set: Drain Accessory Tank and Observe Driver's Dash Gauge (Orange Needle) For Air Loss. (Should Not Fall Below 70 PSI).		
15		Using "Pro-Link", check for any transmission or engine trouble codes. Investigate cause for corrective action.		
F.		<i>Pre-Work Bay Vehicle Preparation</i>		

1		Raise Bus on SE-FAC Lift in Steam Cleaning Bay. Check Undercarriage for Evidence of Fluid Leaks. Note Location of Leaks for Repair During PM.		
2		*Steam Clean the following: Axles, Brake Components, Air Bellows, Wheels, Air Dryer Area, Relay Valves, Hoses, Suspension Beams, Slack Adjusters, Underside of Transmission, Engine, Radiator, Battery Compartment.		* Before Steaming, disconnect fire suppression system nitrogen cylinder to prevent accidental activation of the system. During steam cleaning, avoid spraying system thermostats inside the engine compartment. Afterwards, reconnect nitrogen cylinder. COVER ELECTRONIC SNIFFERS WITH PLASTIC SO THEY ARE NOT DAMAGED.
3	A	Lower SE-FAC Lift. Steam Clean the following: Engine Compartment, Engine, Batteries, Radiator, Power Steering Reservoir Area.		
G.		Work Bay Maintenance		
		Raise bus on on hoist. Perform the following services:		
1	A	Drain engine oil.		
2	A	Change engine oil filters.		
3	A	Reinstall oil pan plug, torque to 55 foot pounds.		
4	A	*Grease all zerk fittings. Refer to lube chart, pages Gen-21 and Gen-22 of Service Manual.		* Ensure to use proper type of grease (3 different types of grease are used per the lube chart).
ITEM #	Type PM	TASK	Action Code	COMMENTS
5	A & C	Check gearboxes for looseness or leaking.		
6	A & C	Check tie rod ends/drag link ends for looseness.		
7	A & C	Check steering drive shaft and u-joints.		
8	A & C	Check brake application and relay valves for air or oil leaks.		
9	A & C	Check air lines for leaks. Drain all air tanks. Look for excessive oil or water build-up.		
10		Check or *change differential & hub oil (80-90 wt.). Check planetary hubs for signs of leakage around drain/fill plugs and seals.		* Change during PMB
11	A & C	Check suspension beams for cracks, bent cross bars or loose bolts.		
12	A & C	Check engine mounts for cracks or loose bolts.		
13		Check bulkheads and A/C bracket for cracks.		
14		Check leveling valves. Adjust if necessary.		

15	A & C	Check drive line slip yoke and u-joints for wear.		
16	A & C	Check axle housing for cracks or leaks.		
17	A & C	Check mud flaps. Replace if necessary.		
18	A & C	Check electrical wiring and hoses for abrasions, excessive rubbing.		
19	A & C	Inspect Brake Lining Wear. If the lining is within 1/16th of an inch of the "wear line" (or less), perform brake job.		
ITEM #	Type PM	TASK	Action Code	COMMENTS
20		Inspect and/or Adjust the following components, per Sections 1 and 2 of the Service Manual.:		
a	A & C	Slack Adjusters.		
b	A & C	Brake Chambers.		
c	A & C	Radius Rod Bushings.		
d	A & C	Air Bellows.		
e	A & C	Shock Absorbers.		
f		Wheel Seals.		
g	A & C	Brake Hoses.		
h	A & C	Tires. (Tread Condition, Tread Depth, Pressure). Tires requiring replacement will be changed by the Mechanic during the PM. Correct PSI is 110 Lbs.		Note Tire Tread Depth (32nds) / Pressure (PSI): RF____/____, LF____/____, RRI____/____, RRO____/____, LRI____/____, LRO____/____
i	A & C	Lug Nuts. (Check for Loose Nuts).		
		Lower the Bus to Ground Level. Perform the following checks and services:		
21	A	Add 29 quarts of new engine oil. Note: Use only "LOW ASH" 15-40 Motor Oil.		
22		Shut off Battery Switch. Disconnect all Battery Cables from Batteries.		
23		Inspect Exterior Condition of Batteries and Cables.		
24		Check Sight Glass on Batteries. (Should be Green).		
25		Load Test Each Battery as follows: Apply a load of 310 amps to the battery for 15 seconds. Observe battery voltage during test. Voltage should not read less than 9 volts. If less, replace battery.		
26		Clean Stainless Steel Sliding Battery Tray.		
ITEM #	Type PM	TASK	Action Code	COMMENTS

27		Clean Battery Posts and Clamps using a Wire Brush. Reinstall cables to battery Posts. Coat posts/clamps with petroleum jelly.		
28		Check all engine compartment electrical wiring harnesses and connections for damage, rubbing, looseness, etc.		
29		Service Engine Cooling System per the procedures in Section 6, paragraph 2.12 of Service Manual.		Test coolant with a test strip. If test strip reading indicates 1200+ ppm of nitrite, it is not necessary to change the "Need-Release" coolant filter at this time. If addition of coolant is required, use pre-mixed antifreeze. Do not add water alone.
30		Inspect the fan drive pump belt for wear. Replace if necessary. Check belt tension (180-200 lbs.).		
31		Check air intake filter. Change as needed.		
32		*CNG Fuel System. Perform checks and services as outlined below. In all cases, refer to Section 7 in the Service Manual for proper procedures.		* Use extreme caution when performing these checks and services. Thoroughly review CNG Safety Procedures outlined on pages 7-1, 7-2, 7-15 and 7-16 of the Service Manual prior to performing these tasks. DO NOT TORQUE BRACKETS.
a	A	Inspect CNG Fueling Compartment. Check door latch sensor/switch. Check condition of refueling valves, gauges and manifold. Ensure refueling valves are clean. Check fuel level by reading high pressure gauge. Reading should be between 200 and 3,600 PSI.		
b		Open roof-mounted CNG tank shrouds for inspection of fuel cylinders and related components.		Caution: Be extremely careful when working on the roof of the bus. Use a suspended safety harness to protect yourself in the event of a fall.
c		Inspect Vent Tube Caps per section 4.4 on page 7-20 of Service Manual.		
ITEM #	Type PM	TASK	Action Code	COMMENTS
d		Perform a visual inspection of the entire CNG Fuel System. (Roof-mounted fuel tanks, valves, pressure relief devices, regulators, hoses, lines and fittings. Also engine compartment filter housings and metering devices).		If you detect the smell of natural gas during the visual inspection, note the source of the smell for further evaluation with gas detector equipment.
e		Fuel Tank (Cylinder) Inspection:		Before proceeding, thoroughly review Tank Inspection procedures contained in paragraph 5.4. on page 7-31 of Service Manual.
f	A & C	Ensure tanks are clean and free of dirt.		Before proceeding with remainder of inspection, wipe down any dust/dirt accumulation with damp rags and a light

				soap solution.
g		Visually inspect entire surface of each tank.		Look for cuts, fractures, abrasions, material damage or separation, discoloration or deterioration of any kind. Pay extra attention to areas around mounting brackets.
h		Mounting Brackets. (Do Not Torque)		Ensure tanks are firmly restrained. <i>Check</i> bracket bolt torque (45 ft-lb., +/- 5 lbs.).
i		Sound (Coin) test.		Lightly tap the entire surface areas of each tank. Listen for consistency of sound. It should sound solid throughout. If a "hollow" or "dead" sound is detected anywhere on the tank surface, notify the Maintenance Supervisor.
j		* Replace High and Low Pressure Coalescing Filter Elements per instructions on pages 7-24 and 7-25 of the Service Manual.		* CAUTION! PART OF THE FUEL SYSTEM MUST BE DEPRESSURIZED BEFORE PERFORMING THIS TASK. SEE PAGE 7-17 OF THE SERVICE MANUAL (STAGE ONE VENTING)!!
k		Check Entire Fuel System for Leaks using "Sensit" Gas Leak Detector.		Starting from the fuel tank area on top of the bus, check every connection point on tanks, lines, valves, pressure relief devices, gauges, etc. Check the entire system from tanks to the engine. If leaks are detected, notify the Maintenance Supervisor.
ITEM #	Type PM	TASK	Action Code	COMMENTS
33		Fire Suppression System.		Review Figure 7-28 in Service Manual prior to proceeding with system checks and services noted below.
a	A	Inspect physical condition of all Fire Suppression components depicted in figure 7-28 of Service Manual. (mechanical damage, security of mounting hardware).		
b		Driver's Fire Suppression Actuator Control Knob/Pin/Nitrogen Cylinder. (Lower Left Side Driver's Panel). Check gauge on bottom of nitrogen cylinder (should be in green range).		Also check for tie-wrap.
c		Test Fire Suppression System Monitor. (Above Driver's Seat). Refer to Section (7.2.10.) of Service Manual. Pages 7-56 thru 7-59.		
d	A	Examine all bleed holes for damage or obstructions.		
e		Check all pressure gauges on fire agent cylinders for correct operating pressure range (green).		
f		Check rupture disc on actuation cylinder for condition (must be unpunctured and free of corrosion).		

g	A	Check all nameplates and instruction labels for legibility.		
h	A	Check nozzles on agent cylinders (must be free of obstructions). Blow-off caps must be intact and secure.		
i	A	Check security of all hose connections.		
ITEM #	Type PM	TASK	Action Code	COMMENTS
34		CNG Gas Detection System.		Review Figure 7-29 in Service Manual prior to proceeding with system checks and services noted below.
a		Inspect physical condition of all CNG Gas Detection components depicted in figure 7-29 of Service Manual. (mechanical damage, security of mounting hardware).		
b		Test CNG Leak Detection Monitor. (Above Driver's Seat). Refer to Section (7.3.5.) of Service Manual. Pages 7-56 thru 7-59.		
c		Check condition of gas sample filters. Replace any that show physical damage.		
d	A	Check all wiring connections (secure and unexposed to the elements).		
e	A	Check external condition of the pump sample box (on roof of bus).		
f		Check all sample hoses (tubes) along the network. Ensure none have abrasions, crimps, cuts, melted areas or other damage.		
g	A	Check all nameplates and instruction labels for legibility.		
h	A	Check calibration of all components per the "Amerex" Maintenance Manual.		
35		Heating and Air Conditioning Systems		
	A	Perform all checks and services outlined on the charts shown on pages 10-12 through 10-14 of the service manual. (Do the 6,000 mile services during a PMA, do all others during the PMB).		This system uses R134 Refrigerant. Please familiarize yourself with safety precautions outlined on page 10-1 of the Service Manual before proceeding with services.
		Mechanic's Name:		X
		I certify that I have performed all of the checks and services required by this checklist. Mechanic's Signature:	X	
		Date Completed:		X

**Preventive Maintenance (PM) Checklist
 “Xcelsior” XN40
 SR 1551, SR1595, SR1810, SR1816
 (Cover Sheet)**

Bus Number: _____ Work Order Number: _____
 Hubometer Reading: _____ Date Work Order Opened: _____
 Check Type PM Required: PMA _____ PMB _____ CHP _____
 Mechanic’s Name: (1) _____ (2) _____
 Supervisor’s Name: _____

<u>Additional Tasks/Repairs to be Completed During this PM</u>	<u>Action Code</u>
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____
6. _____	_____

Mechanic’s Notes or Comments:

Action Codes:  **Inspected, Found OK**

A	Adjusted	N/A	Not Applicable
C.	Cleaned	BWR	Body Work Required
D.	Drained	W/R	Welding Required
L.	Lubricated	P/O	Part Ordered
Rpl	Replaced	Rpr	Repaired

ITEM #	Type PM	TASK	Comments
A.			
Pre-Maintenance Records Review			
	A	Review Maintenance Records and Daily Bus Inspection Sheets (DBI). List all deferred (backlogged) repairs still pending for this bus on this PM Check list. Complete these repairs along with this PM. (It is important to keep repairs on a separate work order. If in doubt ask Supervisor.)	
B.			
Exterior Visual Inspection			
	A & C	Turn Master Run Switch to "Night Run" position. Start engine. Engage fast idle. Activate rear door interlock. Activate both turn signal foot switches at the same time. Walk around outside the bus and check the condition/operation of the following:	
1	A & C	Headlights. Also engage and check high beams.	
2		All Flashers.	
3	A & C	Marker Lights, including License Plate Light, Turn Signal Lights and Curb Lights.	
4	A & C	Brake/Tail & Reverse Lights, Reverse Audible Alarm (Beeper).	
		Shut down the engine. Continue exterior visual inspection as follows:	
5	A & C	Windshields (Cracks, Breaks, General Condition).	
6	A & C	Wiper Blades/Arms.	
7	A & C	Destination Signs: Front, Side, Rear. (Turn on Power, Observe Operation). Includes interior LED lights.	
8	A & C	Exterior Mirrors. (Also Check R/H for Remote Control Adjustability).	
9	A	Bumpers.	
10	A & C	License Plates/Brackets.	
ITEM #	Type PM	TASK	
11	A & C	Paint/Decals/Outside Glass	
12	A & C	Wheels/Lugs Retorque every 7500	
13	A & C	Body Damage (Incl. CNG Tank Shrouds on Roof). Sides panels, access doors.	
14	A & C	Check Ground Under Bus for Fluid Leaks. Note location/source of leaks.	
15	A & C	Bike Rack/Check operation/Check Deploy indicator Lamp. Deploy the rack unit and check for operation	
C.			
Interior Visual Inspection (Driver's Area)			
Check the condition/operation of the following:			
1	A & C	Registration Certificate and Insurance Card in Panel Behind Driver.	
2	A & C	Driver's Storage Compartment & Plexiglas Access Door. (Directly behind Driver's Seat). Check Latches. For XN40 Driver's Storage is Overhead	

3	A & C	Steering Wheel Tilt and Telescopic Features. Check Horn	
4	A & C	Turn Steering Wheel, Check for Binding. Check Horn.	
5	A & C	Check Steering Wheel Free Play (2.75" Max.)	
6	A	Driver's Seat. Seat Controls. Seat Belt. Clean When Required	
7	A & C	Sun Visors and Shades	
8	A & C	Dash Lights, Speedometer and Gauges.	
9	A	Dash Knobs and Switches (Incl. Side Dash Panel).	
10	A & C	Driver's Defroster Control Knobs. (Operate Defroster)	
11	A & C	Wiper Control Knobs. (Operate Wipers)	
12	A	Farebox (Check for Clean Fare Schedule) OCU Check Stanchions and Mounts. Check stanchions.	
13	A & C	Foot Switches (Headlight Dimmer, R&L Turn Signals, Public Address, Speak Easy. Check Int/Ext and Both Settings	
ITEM #	Type PM	TASK	
14	A & C	Heater Controls/Operation.	
15	A & C	Kneeling Operation. Cycle at Least Twice. Listen for Beeper.	
16	A & C	Wheelchair Ramp Operation. Cycle at Least twice. Listen for Beeper. XN40 Ramp Must Not Slam on Stow or Deploy	
17	A & C	Wheelchair Ramp Hydraulic Fluid Level. Check for Leaks. XN40 Deploy Ramp and Remove Cover to Access Reservoir and Cylinder	
18	A & C	Check Radio Operation with Dispatcher.	
19	A & C	Destination Sign Controls. (ODK)	
20	A	Destination Sign Access Door/Locks.	
21	A & C	Front Door Operation. (Also, Check Emergency Manual Door Controls). Check APC System Check Exterior Annunciation	
22	A & C	Rear Door Operation. Rear Door Touch Tape. (Also, Check Sensitive Edges and Emergency Manual Door Controls). Check APC System Check Interior and Exterior Annunciation Check Driver/Passenger Control Switch Check Class Vapor System	
23	A & C	Rear Door Indicator Light. Check Proper Interlock Operation	
24	A & C	Accelerator Pedal Operation (Check Wobble, Binding or Sticking).	
25	A & C	Brake Pedal Operation (Check Wobble, Binding or Sticking).	
D.		Interior Visual Inspection (Passenger Area)	
		Check the Condition/Operation of the Following: Replace or Repair as Necessary	
1	A & C	Dome (Aisle) Lights and Step Lights.	
2	A & C	Passenger Signal System (Stop Request Signs, Pull Cords, Touch Tapes or pull cords). Check for Audible and Visual Signal	
3	A & C	Activate the stop request check for audible and light/s	
ITEM #	Type PM	TASK	

3	A	Passenger Seats, Seat Inserts. Check for Cuts, Graffiti, etc. Replace Damaged or Stained Inserts	
4	A	Walls, Bulkheads. Check for Damage, Graffiti, Excessive Dirt, etc. Clean Where Applicable	
5	A	Windows, Window Graffiti Shields, Brackets. (If Shields Badly etched, Replace). Includes Exit Door Film	
6	A & C	Stanchions, Grab Straps, Modesty Panels.	
7	A & C	Emergency Windows, Roof Exits. Xcelsior glass safety hatch	
8	A	Condition of Floor, Stainless Steel Kick Panels. (Check for Excessive Dirt, etc.)	
9	A	Rear Seat Firewall Engine Access Cover, Bolts, Insulation. Secure?	
10	A	PLC Compartment Above Rear Seats. Secure?	
11	A	All Panels and Interior Trim. Tighten/Replace Loose/Missing Screws.	
12	A	Condition of Miscellaneous Interior Decals. Replace Worn Decals as Required	
13	A	Evidence of Rain Water Leaks.	
14	A	Interior Mirrors. Secure? Adjustability? Clean?	
15	A,B&C	Wheelchair locks, seat belts, folding seats, stop request touch tape. Check for Binding, Cuts, Frays, Inertia Lock. Connect and Hook Belts to Indicate Inspection Performed	
16	A & C	Inventory Emergency Reflector Triangles (Should be 3). Box is mounted on curbside front wheel well. Ensure lid latches	
17	A & C	Inspect Fire Extinguisher for Complete Charge. Mounted next to reflectors.	
18	A	Inspect Route Map Holder. Mounted next to reflectors.	
19	A & C	Check all interior safety decals and signage for consistency	
ITEM #	Type PM	TASK	
E.		Pre-Work Bay Test Drive	
		Test Drive the Bus. Check the following:	
1	A	Check for Normal Acceleration.	
2	A	Check Brake Operation. Stopping distance performance	
3	A	Check for Proper Transmission Shifting and Retarder Operation and Light	
4	A	Note Any Suspension Noise.	
5	A & C	Low Air Alarm-Buzzer, Dash Indicator Light. Alarm on at 65 PSI, Off at 85 PSI.	
6	A & C	Parking Brake Operation: Apply and release foot brake pedal once every second until driver's pop-off valve activates. Pop-off valve should activate at approx. 60 PSI.	
7	A & C	Set Parking Brake, Engage Fast Idle.	
8		Air Compressor Buildup Time. 80-100 PSI in Maximum of 45 Seconds.	
9	A & C	Governor Cut-In Pressure: 95 PSI Minimum. Cut-Out Pressure: 130 PSI Maximum.	
10	A	Release Parking Brake.	

11	A	When Governed Pressure is Reached, Shut Off Engine. Check static pressure	
12	A & C	With Brakes Released, Perform Static Air Loss Test for 1 Minute. After Pressure Gauge Needles Have Stabilized, Note Air Loss. (2 Lbs. Maximum Air Loss).	
13	A & C	Perform Dynamic Air Loss Test for 1 Minute. Note Air Loss. (2 Lbs. Maximum Air Loss).	
ITEM #	Type PM	TASK	
14	A & C	With Engine Off, Parking Brake Set: Drain Accessory Tank and Observe Driver's Dash Gauge (Orange Needle) For Air Loss. (Should Not Fall Below 70 PSI).	
15	AB & C	Using "Pro-Link", Check for Transmission Codes or Use Laptop With Insite Program for Engine trouble codes. Take Corrective Action.	
F.		Pre-Work Bay Vehicle Preparation	
1	AB & C	*Steam Clean the following: Wheels, Air Dryer Area, Suspension Beams, Underside of Transmission, Engine, Radiator, Battery Compartment. Power Steering Reservoir Area. Cover Gas Detection Sensors for Water Intrusion Remove and Clean A/C Intake Screen And Defroster Screen. Clean Fuel Receptacle Compartment	
2	AB & C	Using Proper Fall Protection Equipment. Access Bus Roof Area And Wash CNG Tanks With Hose. DO NOT EVER USE HIGH PRESSURE STEAM CLEANER ON CNG TANKS OR PRD VALVES	
G.		Work Bay Maintenance	
		Raise bus on hoist. Perform the following services:	
1	A & B	Drain engine oil. Take Sample @ B Service	
2	A & B	Change Spin-on or Inspect and Clean Re-Usable engine oil filters. Ensure 4 Magnets are Present Around Element	
3	A & B	Torque Oil Pan Plug to 55 FT/LBS	
4	A & B	Remove HVAC intake and defuser screens for cleaning.	
5	A & B	*Grease all zerk fittings Using Proper Grease Per Application. Refer to Appropriate Service Manual For Series of Bus XN40 Use Special Purpose Grease LX-OTP 2 for Steering Knuckle	
6	A & B	Inspect Rear Differential Fluid Level and Change @ Appropriate Interval XN40 Use Mineral Oil Based 80W90	Inspect every C
ITEM #	Type PM	TASK	
5	A & C	Check gearboxes and Hydraulic Hoses for Looseness/Leaking.	
6	A & C	Check tie rod ends/drag link ends for looseness.	
7	A & C	Check steering drive shaft and u-joints Lube as Needed	
8	A & C	Check brake application and relay valves for air or oil leaks.	
9	A & C	Check air lines for leaks. Drain all air tanks. Look for excessive oil or water build-up. Check Air Dryer and Service @ Prescribed Interval XN40 Has 2 Dryers	

10	A & B	Check or *change differential & hub oil (80-90 wt.). Check planetary hubs for signs of leakage around drain/fill plugs and seals. XN40 Use Mineral Oil Based 80W90	Inspect Every C
11	A & C	Check suspension beams for cracks, bent cross bars or loose bolts	
12	A & C	Check engine mounts for cracks or loose bolts.	
13		Check bulkheads and A/C bracket for cracks.	
14		Check leveling valves. Adjust if necessary. Check for Front And Rear Ride Height (3")	
15	A & C	Check drive line slip yoke and u-joints for wear.	
16	A & C	Check axle housing for cracks or leaks.	
17	A & C	Check mud flaps. Replace if necessary.	
18	A & C	Check electrical wiring and hoses for abrasions, excessive rubbing.	
19	A & C	Inspect Brake Lining Wear. If the lining is within 1/16th of an inch of the "wear line" (or less), perform brake job.	
20	AB & C	XN40 Inspect Brake Wear per Section 1 & 2 of SR1551 and SR1559 Service Manual. Pad Clearance .027-.047 Thousandths Brake Disc Minimum Thickness 1.535	
	Note	It is Necessary to Remove Wheels to Perform Brake Inspection	
ITEM #	Type PM	TASK	
20		Inspect and/or Adjust the following components, per Sections 1 and 2 of the Service Manual.:	
a	A & C	Slack Adjusters.	
b	A & C	Brake Chambers.	
c	A & C	Radius Rod Bushings.	
d	A & C	Air Bellows.	
e	A & C	Shock Absorbers	
1	Note	XN40 Shock Absorbers have Adjustable Rebound Dampening Refer to Section 1 and 2 of SR1551 and SR1559 Service Manual	
f		Wheel Seals.	
g	A & C	Brake Hoses.	
h	A & C	Tires. (Tread Condition, Tread Depth, Pressure). Tires requiring replacement will be changed by the Mechanic during the PM. Correct PSI is 120	Note Tire Tread Depth in 32nds/Pressure in PSI RF___/___, LF___/___ LRI___/___ LRO___/___, RRI___/___, RRO___/___
i	A & C	Lug Nuts. (Check for Loose Nuts). Torque every 7500 Miles at each PM cycle	
		Lower the Bus to Ground Level. Perform the following checks and services:	
21	A	Add CNG Engine Oil. Note: Use only "LOW ASH" 15-40 Motor Oil. 8.3 24qts 8.9 28qts	
22		Shut off Battery Switch. Disconnect all Battery Cables from Batteries.	
23		Inspect Exterior Condition of Batteries and Cables.	
24		Load Test Each Battery as follows: Apply a load of 310 amps to the battery for 15 seconds. Observe battery voltage during test. Voltage should not read less than 9	

		volts. If less, replace battery.	
25		Clean and lube Stainless Steel Sliding Battery Tray.	
ITEM #	Type PM	TASK	
27	A&B	Clean Battery Posts and Clamps using a Wire Brush. Reinstall cables to battery Posts.	
28	A&B	Check all engine compartment electrical wiring harnesses and connections for damage, rubbing, looseness, etc.	
29	Annual	Service Engine Cooling System per the procedures in Section 6 of Service Manual relating to SR# being serviced. EGR Valve	
30a	All But XN40	Inspect the fan drive pump belt for wear. Replace if necessary. Check belt tension (180-200 lbs.).	
30b	XN40	Check EMP Sytem Operation Follow EMP Maintenance Procedures	
31		Check air intake filter. Change as needed.	
32		*CNG Fuel System. Perform checks and services as outlined below. In all cases, refer to Section 7 in the Service Manual for proper procedures. Do Not Torque Brackets	
a	A&B	Inspect CNG Fueling Compartment. Check door latch sensor/switch. Check condition of refueling valves, gauges and manifold. Ensure refueling valves are clean. Check fuel level by reading high pressure gauge. Reading should be between 200 and 3,600 PSI.	
b		Open roof-mounted CNG tank shrouds for inspection of fuel cylinders and related components.	
c		Inspect Vent Tube Caps per section 4.4 on page 7-20 of Service Manual. Replace When Missing	
ITEM #	Type PM	TASK	
d		Perform a visual inspection of the entire CNG Fuel System. (Roof-mounted fuel tanks, valves, pressure relief devices, regulators, hoses, lines and fittings. Also engine compartment filter housings and metering devices).	
e		Fuel Tank (Cylinder) Inspection:	
f	A B & C	Ensure tanks are clean and free of dirt. Water hose only Do not pressure wash Use Mild Soap when needed	Look for cuts, fractures, abrasions, material damage or separation, discoloration or deterioration of any kind. Pay extra attention to areas around mounting brackets. If deficiencies are found advise a Supervisor. Do not attempt to perform any CNG tank repairs.
g		Visually inspect entire surface of each tank.	
h		Mounting Brackets. Ensure tanks are firmly restrained (Do Not Torque)	
i		* Replace High and Low Pressure Coalescing Filter Elements per section 7 of appropriate Service Manual.	
j		Check Entire Fuel System for Leaks using "Bird Dog" Gas Leak Detector.	Starting @ fuel tank, check every connection point on tanks, lines, valves, pressure relief devices, gauges etc. Check the entire system from tanks to engine. If

ITEM #	Type PM	TASK	leaks are detected, notify the Maintenance Supervisor.
33		Fire Suppression System. 2 Year Maintenance includes nozzle inspection. Recertification by licensed inspection and repair company required every 6 years	
a	A	Inspect physical condition of all Fire Suppression components depicted in section 7 of applicable Service Manual. (mechanical damage, security of mounting hardware).	
b		Driver's Fire Suppression Actuator button. (LF 40 Lower Left Side Driver's Panel). (XN40 Overhead left side above driver). Ensure retaining pin and plastic tie are in place.	
c		Test Suppression System Monitor. (Above Driver's Seat). Refer to Section 7 of Service Manual.	
d	A	Examine all bleed holes for damage or obstructions. Examine all mounting brackets.	
e		Check all pressure gauges on fire agent cylinders for correct operating pressure range (green).	2001 LF 40 has 1 bottle on roof under tank covers. 2003-2009 have no roof bottle. 2001-2009 have bottle behind rearmost left side light panel behind access cover. Use mirror to read gauge. XN40 has bottle behind light panel left side @ bank opposite exit doors.
f		Check rupture disc on actuation cylinder for condition (must be unpunctured and free of corrosion). Clean cylinder (Nitrogen)	
g	A	Check all nameplates and instruction labels for legibility and cleanliness.	
h	A	Check nozzles on agent cylinders (must be free of obstructions). Blow-off caps must be intact and secure.	
i	A	Check security of all hose connections. Check for fraying, rubbing and replace as necessary.	
ITEM #	Type PM	TASK	
34		CNG Gas Detection System.	
a		Inspect physical condition of all CNG Gas Detection components depicted in section 7 of Service Manual. (mechanical damage, security of mounting hardware). Perform a visual observation of the full system	
b		Test CNG Leak Detection Monitor. (Above Driver's Seat). Refer to Section 7 of Service Manual. Observe lights for all zones.	
c		Check condition of gas sample filters. Replace any that show physical damage.	
d	A	Check all wiring connections (secure and unexposed to the elements).	
e	A	Check external condition of the pump sample box (on roof of bus).	
f		Check all sample wiring or hoses (tubes) along the	

		network. Ensure none have abrasions, crimps, cuts, melted areas or other damage. Replace as required	
g	A	Check all nameplates and instruction labels for legibility.	
h	A	Check calibration of all components per the "Amerex" Maintenance Manual.	
35		Heating and Air Conditioning Systems	
	A	Perform all checks and services outlined on the charts shown on pages 10-12 through 10-14 of the service manual. (Do the 7,500 mile services during a PMA, do all others during the PMB).	Check to make sure of proper refrigerant type
36	A,B,C	AVL System	
		Verify DCM boots up to Home Screen	
		Verify DCM logs on properly	
		Verify DCM and connections secured	
		Verify route on Destination sign and annunciation	
		Verify reboot /use code 7356	
		Verify DCM displays RTT received	
		Initiate RTT and verify reception of radio through handset -static should not be observed	
		Verify Brightness and Contrast adjustments on DCM	
		Verify audio adjustment on DCM	
		Interface point for external data and discrete signs to the Smart MDT (DCM)	
		Verify radio display shows "BUS 1"	
		Verify GPS and Data communication	
		Verify GPS receiving and in Orbcad	
		Verify WLAN Idle at DCM	
37	A, B,C	APC System	
		Inspect APC sensors and IRMA box (in front bulk head)	
		Count entrance & exit passengers. Close doors and open; exit rear door and enter front doors; close doors.	
		Verify on DCM - press APC button; count screen will appear	
		Verify cover patterns with lap top and check for sensor connections	
		Verify clear path and routing of cables/harnesses are clear	
38		Surveillance Syst	
		Inspect all camera appearances for damage	
		Verify recording at key pad display and green status light at tag button display	
		Verify all Mobile view III camera's with black box and verify housing security	Penta 8 use laptop
		Verify display control panel	
		Verify stop annunciations through interior and exterior speakers	

		Verify boot up pattern and shows stop request when touch tape at W/C is pressed. Listen for the two rings.	
		Verify through Mobile view display and check for head sign change to call PD; Orbcam will show E/A	
Unit	Date	Work Order	
		Mechanic's Name:	
		I certify that I have performed all of the checks and services required by this checklist.	
		Mechanic's Signature:	
		Date Completed:	

Appendix B – AVL System Maintenance Checklist

AVL Checklist		PM and CHP inspection
Item	What it does	What to look for
DCM	Driver's Control Module	Verify DCM boots up to Home Screen
	DCM logon	Verify DCM logs on properly
	DCM bracket	Verify DCM and connections secured
	Route display	Verify route on Destination sign and annunciation
	Maintenance-diagnostic	Verify reboot /use code 7356
	DCM RTT send	Verify DCM displays RTT received
	DCM Bright/Cont	Verify Brightness and Contrast adjustments
Handset	Voice communication	Verify audio adjustment on DCM
IVU	In Vehicle Unit main processor	Interface point for external data and discrete signs to the Smart MDT (DCM)
City radio	Transmits and receives voice	Verify radio display shows "BUS 1"
Radio antenna	Voice transmitting	Verify reception of radio -static should not be observed
Data radio	Transmits and receives data-IE-GPS	Verify GPS and Data communication
GPS Rvr and Antenna	Gps signal	Verify GPS receiving and in Orbcad
WLAN Antenna	Connection for upload and down load	Verify WLAN Idle at DCM
APC	Automatic Passenger Count	count entrance & exit passengers
Front sensor	sensor counting	Verify on DCM
Rear sensor	sensor counting	Verify on DCM
IRMA	Main controller	Verify cover patterns with lap top and check for sensor connections
Trays and cables	Equipment storage with cables	Verify clear path and routing of cables/harnesses are clear
DVR	Record video images from cameras	Verify recording at key pad display and green status light at tag button display (red light not normal)
Cameras and housings	Observe motion	Verify all cameras with black box and verify housing security
Mobile View display	DVR frame per second	Verify display
PA Amplifier	Provides Audio	Verify stop annunciations through interior and exterior speakers
Interior Front Led sign	Displays date and time	Verify boot up pattern and shows stop request when touch tape at W/C is pressed. Listen for the two rings.
Interior Rear Led sign	Displays date and time	Verify boot up pattern and shows stop request when touch tape at W/C is pressed. Listen for the two rings.
Alarm - E/A button	Enable silent alarm	Verify through Mobile view display and check for head sign change to call PD; Orbcad will show E/A
Alarm - G-force	Enable alarm when suddenly impacted	Verify Mobile view display
Tag button	Enable alarm to record with camera's	Verify Mobile view display
Unit	Date	Work Order