

## 1.0 SCOPE, PURPOSE & CLASSIFICATION

### 1.1 Scope

It is the intention of this specification to describe a vehicle of substantial and durable construction in all respects. Particular attention is given to features that provide the safest possible vehicle.

### 1.2 Purpose

The purpose of these specifications is to describe a mid-sized transit bus used to transport passengers in both rural and urban areas. The bus will be of a "Steel Cage" type construction with vacuum laminated sidewalls, rear wall, and roof. The bus body is to be mounted on a Ford E450 Cutaway chassis, with the "Shuttle Bus" option included.

### 1.3 Classifications

This specification calls for the following type of vehicle. It is in accordance with applicable FMVSS requirements, including FMVSS 220 and FMVSS 221. The bus is approved as a minimum 4 year/100,000 mile bus in accordance with the guidelines for the Altoona Bus Testing Center. Include a copy of the Altoona test report summary.

### 1.4 Materials

All materials used in conversion of the bus conform in all respects to American Society of Testing Materials, Society of Automotive Engineers or similar association standards.

### 1.5 Warranty

- A. General: provide a 1-year or 12,000 miles parts and labor warranty to cover all components and parts on this vehicle, including paint and electrical.
- B. Body: provide a 6 year / 60,000 mile warranty on the performance of the steel structure of the body against failure of the welds or other substantial defects.
- C. Chassis frame, engine and transmission: Warranty on the chassis, engine and transmission of the vehicle shall be the responsibility of the chassis manufacturer.

## 2.0 CHASSIS SPECIFICATION

### 2.1 Standard Chassis Equipment

- Cutaway Chassis minimum 14,500 LB chassis
  - Front Chrome Bumper and Grill
  - Aerodynamic Sealed Beam Headlights
  - Engine Block Heater
  - Driver Air Bag
  - Front License Plate Bracket
  - Minimum 225-AMP alternator on gas chassis
- Dual Rear Wheels
- Radio Prep Package
- Inside Day/Night Rearview Mirror
- Daytime Running Lights

- Front and Rear Heavy Duty Shock Absorbers
- 6 Speed TorqShift® Automatic Transmission with Overdrive (Tow/Haul Mode with Gas Engines)
- Auxiliary Transmission Oil Cooler
- Tilt Steering Wheel
- Power Steering
- Driver's Sun Visor
- Engine Oil Pressure Gauge
- Electronic Speedometer
- 4-Wheel ABS Hydraulic Disc Brakes with Hydro-Boost
- 55 Gallon Fuel Tank
- Alternator: 225 Amps
- Rear Axle Capacity: 9500# (E-450 w/ 14,500# GVWR)
- Dual Batteries: One (1) 750 CCA mounted under hood and One (1) 750 CCA Battery mounted on a slide tray. The battery door will have dual locks.
- Rear Axle Ratio: 4.56 on E-450
- Six (6) Tires: LT225/75Rx16E, "E" Rating
- Wheels Painted White
- 50 State Emissions Package (Gas Engines meet 2010 emission levels)

## **2.2 GVWR**

14,500 LBS Minimum

## **2.3 Axles and Suspension**

Twin I-beam independent front suspension with caster camber kit. Front stabilizer bar. Heavy-duty front and rear shock absorbers. Front springs shall be coil spring type and have capacity equal or greater than the axle. Multi-leaf rear spring suspension.

A Mor Ryde Suspension System will be installed on the rear.

## **2.5. Electrical**

The vehicle shall operate on a 12-volt system with dual batteries.

- A. An AM/FM/CD with 4 interior speakers will be provided.
- B. Ground Plane and pre wire for installation of two way radio will be provided.

## **2.6. Engine**

The engine is a 6.8L V-10 Triton Gasoline.

## **2.7. Exhaust System**

The vehicle is equipped with an exhaust system that meets United States Government noise level and exhaust emission (smoke and noxious gases) requirements. The exhaust system is Stainless Steel or Aluminized Stainless Steel. The exhaust tail pipe shall extend to the rear of the vehicle, unless otherwise requested.

## **2.8. Fuel System**

Fuel tank has minimum 55 gallons internally baffled to prevent surging and rigidly supported by at least two (2) supports arranged for easy removal. An engine mounted fuel filter is also supplied. A fuel access late shall be mounted over sending unit.

## **2.9. Tires and Rims**

Vehicles are equipped with six ventilated pressed steel wheels, 16" diameter. Dual rear wheels standard. All wheels are inter-changeable. Tires are steel-belted radials with all-season tread, LT225/75Rx16E. OEM tires and wheels. Wheels are painted (or powder-coated) white.

A spare tire shipped loose in the bus will be provided.

## **2.10. Transmission**

The transmission is a Ford automatic TorqShift® Overdrive 6-speed transmission with auxiliary in-tank oil cooler. Transmission shift lever is interlocked with starting motor to prevent engagement of starter in any gear position other than neutral or park.

## **2.11. Air Conditioning and Heater**

- A. The chassis is equipped with an OEM heater, air conditioner and defroster systems. Provisions are made for connecting heated coolant for optional heaters in the passenger cabin. Coolant shut-off valves installed in the rear heater hoses are standard and are located under the cab behind the driver's area.
- B. Front heater, front air conditioner and defrosters are operated by OEM supplied controls located on the dash within easy reach of the driver.
- C. The air conditioner in the passenger area will be a minimum of 70,000 BTU dual compressor system. The evaporator will be rear mounted. The second compressor will be a minimum of a TM16. Mud flaps will be mounted front and rear of the skirt mounted condenser.
- D. A 35,000 BTU passenger area floor mounted heater will be provided.
- E. A driver's area mounted circulating fan will be provided. Location will be determined by agency.

## **2.12 Chassis and Cab Glass**

- A. The windshield is a one-piece design and provided by the chassis OEM. Windshield is laminated AS-1, UV protected, safety glass.
- B. The driver's window is provided by the chassis OEM and is capable of opening. This window is tempered or laminated safety glass and is AS-2 rated.
- C. A curbside transition window is located between the windshield and the main passenger entry door. This window is made of tempered safety glass and is AS-2 rated. The size of the window is approximately 400 sq. inches and is positioned to allow the driver visibility of the curb.
- D. A Driver's Side Running Board with a 4" reflective yellow painted edge will be provided.

## **2.13 Instruments and Gauges (The following instruments are provided as standard:)**

- A. Oil pressure gauge
- B. Oil pressure warning lamp
- C. Fuel tank level gauge
- D. Engine coolant temperature gauge
- E. Engine temperature warning lamp
- F. Headlight high beam indicator
- G. Directional signal and flasher action light
- H. Tachometer
- I. Speedometer
- J. Battery voltage
- K. Odometer / Trip meter
- L. Charging system warning light
- M. Fasten safety belt warning light
- N. Brake system warning light / parking brake indicator
- O. Water in Fuel indicator (diesel only)
- P. Low fuel warning light
- Q. Wait to start warning light (diesel only)
- R. Anti-lock braking system warning light
- S. Service engine soon indicator
- T. Airbag ready indicator

The following controls, in addition to the normal steering, braking and transmission functions are provided:

- Column mounted turn signal lever
- Emergency flasher facing driver and clearly visible
- Door control at driver's location (manual or electric)
- Master exterior light switch
- Separate switch and temperature controls for driver heaters, defrosters, and A/C
- Two-speed wiper control with intermittent feature
- Windshield washer
- Driver dome light

#### **2.14. Mirrors**

Right hand and left hand, fully adjustable, breakaway style, outside rear view mirrors are provided with a 2-in1 head design that incorporates a flat mirror and convex. Flat mirror nominal 10" high x 8" wide. The standard convex mirror is mounted below the flat mirror.

An 8" crossover exterior mirror will be mounted on driver's side front fender

In addition to the OEM mirror, a 6" x 16" flat mirror mounted above driver's head and a 6" convex interior round mirror will be mounted on interior front header.

#### **2.15. Drive Shaft, Steering, Brakes**

- A. DRIVE SHAFT: The drive shaft is a heavy-duty type utilizing one or more needle bearing universal joints or equivalent. Drive shaft guard(s) are installed to prevent it from striking the floor of the bus or the ground in the event of a tube or universal joint failure.
- B. STEERING: OEM Power steering required. All steering linkage wear points, including tie rod ends, are fitted with lubrication fittings and replacement bushing or inserts. The steering wheel is equipped with "Tilt" feature (Cruise Control optional).
- ~~C.~~ B. BRAKES: Service brakes are OEM 4-wheel ABS, power assisted, disc with Hydro-Boost. Braking system shall be adequate for the GVWR of the vehicle.

## **3.0 ELECTRICAL SYSTEMS AND COMPONENTS**

### **3.1. Electrical System**

- A. The electrical systems and equipment comply with all applicable FMVSS and SAE recommended standards and practices. All electrical and electronic components are selected to minimize electrical loads thereby not exceeding the vehicle's generating capacity. All electrical system components and wiring are easily accessible through access panels for checking and for maintenance. All switched indicators and controls are located and installed in a manner that facilitates easy removal and servicing. All exterior housings of lamps and fixtures shall be corrosion resistant and weatherproofed.
- B. One (1) alternator of at least 225 amperes SAE output at governed engine speed is provided.
- C. The switch panel, mounted on or near the dashboard within easy reach of the driver, incorporates all switches to operate the passenger cabin systems, including the following: electric door switch (when specified), wheelchair lift power (when specified), passenger compartment master light switch, front and rear air conditioning, and front and rear heater switches. The front and rear air conditioning and heater controls are separate from each other. Switches are rocker-style, backlit for easy night operation, and permanently labeled with universal symbols for identification.
- D. The electrical system incorporates an audible tone and warning light (located either on the switch panel or the dashboard), to show a door ajar condition when the bus has a rear exit door or a side wheelchair door.

- E. Circuits shall serve the bus body and accessory electrical equipment separate and distinct from the vehicle chassis circuits. All wiring provided by the bus manufacturer shall be copper and conform to all the SAE J1292 requirements.
- F. All general-purpose wiring meets SAE standards. Each wire is color, number, or function coded at a minimum of 6" intervals the entire length of the wire.
- G. Wiring harnesses are protected by a split loom in a color other than that used by the chassis manufacturer. All looms and wiring are secured to the body or frame with straps or P-clamps in order to prevent sagging and movement that results in chafing, pinching, snagging, or any other damage.
- H. All harness and wiring terminals terminate at appropriate junction terminals set in Bake-Lite or molded plastic material. All wiring and end connectors are of the soldered, hand or machine-staked type, Waggo terminals.
- I. All wiring devices, switches, and etc, are rated to carry at least 125% of the maximum ampere load for which the circuit is protected. There is a master electrical distribution panel located in a compartment above the driver's door with access from inside the bus. Within the compartment, power distribution is accomplished through a distribution module utilizing multi-layer metal grids and Packard 280-and 800-series connection pins. Circuits are connected to the distribution center through keyed and color-coded, metri-pak connectors. Automotive style mini and micro relays and fuses provide circuit protection.
- J. A heavy-duty, electric horn is furnished and installed by the chassis OEM in an area protected from wheel wash.

### **3.2. Battery System**

Dual Batteries: One (1) 750 CCA mounted under hood and One (1) 750 CCA Battery mounted on a slide tray. The battery door will have two locks. A battery maintenance, Pulse Tech or approved equal will be mounted on both batteries.

### **3.3. Wiring Gauge**

The main wiring harness installed by the bus manufacturer is rated to carry 125% of the maximum load rating of the circuit it is designed to service. All cables larger than 18 AWG have the terminals mechanically crimped to insure minimal voltage drop.

### **3.4. Battery Cable Routing**

The routing of the battery cable is from the battery compartment to the main power distribution panel. The battery cables are 2 GA AWG and run to the main power distribution panel via the cab and shall be fully protected by high temperature loom and routed through rubber insulated metal cable clamps. The battery cables are not routed under chassis frame components.

## **4.0 VEHICLE LIGHTING REQUIREMENTS**

### **4.1. Vehicle Exterior Lighting**

- A. All exterior lights meet state and U.S. DOT requirements.
- B. Sealed beam headlamps are supplied with high and low beam controlled from the turn signal switch. OEM Daytime Running Lights standard.
- C. Directional signals meet all Federal Motor Vehicle Safety Standards front and rear. A lever on the steering column operates directional signals. Front turn signals are OEM chassis supplied. Two (2) rear turn signals are 4" round, amber LED lights mounted in weather-tight, recessed pockets.
- D. In addition to directional signals, rear lamps consist of two (2) red 4" LED brake lights and two (2) clear 4" LED back-up lights mounted in weather-tight, recessed pockets.
- E. A circuit is provided for the directional signals which, when on, will cause them to function as traffic hazard warning signals. (Emergency flashers operate independent of the brake lights.)
- F. The flasher unit for directional signals and emergency flashers is replaceable from inside the vehicle and is a simple plug-in unit.

- G. An LED license plate light is provided on the rear of the vehicle.
- H. Five (5) amber LED clearance lights are provided on the front cap.
- I. Seven (7) red LED marker lights are provided on the rear of the bus comprised of five (5) across the top and two (2) on the lower skirt panels.
- J. All marker lights shall be Armored for protection.
- K. 7" Amber LED front and 7" Red LED Rear lights mounted in the upper corners of both front and rear. The rear lights shall flash with the doors and steady with the brakes applied.

#### **4.2 Vehicle Interior Lighting**

- A. The interior bus lighting configuration includes the following as a minimum; a driver's dome light centered above the windshield that activates when driver's door is open or with a switch located on the light, OEM instrument panel lights, switch panel backlighting, at least six (6) dome lights evenly spaced on the ceiling cove panels throughout the passenger cabin, and two (2) stepwell lights that adequately illuminate the step well, wired to automatically activate when the passenger door is opened.
- B. All emergency egress doors and windows are identified with a red LED light illuminated at all times when ignition is on.

## **5. VEHICLE BODY**

### **5.1. Body, General Construction**

The body structure is built as an integral steel-cage unit. All joints and corners where stress concentration may occur are adequately reinforced to carry required loads and withstand road shock. The bus body is certified by an independent testing agency to meet the requirements of Federal Motor Vehicle Safety Standard Number 220 (School Bus Rollover Protection.)

### **5.2. Body Structural Framing**

- A. The vehicle body structure incorporates an integral, fixture-welded, steel body frame for floor, front, rear, sidewalls and roof, essentially forming a steel cage around the passenger cabin. Welding is used to fasten the floor to sidewalls, and roof to sidewalls, creating a steel structure as the primary load-bearing mechanism.
- B. The sidewall structure is made of 1" x 2" 16 and 18 GA custom formed steel wall bows welded vertically on 19" ± 1" centers, with 1" x 1" 16 GA steel tube running laterally at the top and bottom of the wall and at the window frames. Steel gussets are welded into the corners of the window frames for added support.
- C. The roof structural support members are made of 16 GA steel capped hat section roof bows, 1-1/2" high by 3-1/2" wide, spaced on approximately 24" ± 1" centers. At least one (1) roll bar of 9 GA steel is installed, approximately in the middle of the roof structure. Depending on the length of the body, additional rolls bars are added as required. The roof bows are welded at the ends to 1" x 1" 16 GA steel tubes running the entire length of the roof. 1" x 3-1/2" 12 GA steel channels are welded to the roof bows where the rear air conditioner evaporator will be attached (when so equipped). Additional steel plates are added for attachment of stanchions, ceiling grab rails, etc. The roof is welded to the sidewalls.
- D. The exterior sidewalls are seamless fiberglass reinforced plastic (FRP) or approved equal. Panels must be vacuum laminated to the steel cage structure. The exterior roof panel is a seamless piece of FRP vacuum laminated to the steel cage structure. The sidewalls and roof are welded together at the roof gutter above the windows. Two sided tape with manufacturing adhesive wall construction will not be acceptable. Side panels below the floor line are aluminum and easily removable for service and repair.

- E. The steel mounting tracks for the passenger seats are welded to the sidewall steel frame and to the steel sub-floor. Any other method of attaching the seat track to the bus body is not acceptable.
- F. Prior to the vacuum lamination process, the steel cage walls and roof sections are treated with an anti-corrosion primer and filled with appropriate thickness, two-pound, high-density expanded polystyrene to provide an insulated body structure with an R-value of at least R-6. Once the sections are welded together, the welds are ground smooth and treated again with the anti-corrosive primer.
- G. Prior to the vacuum lamination process, all body sections (roof, sidewalls and rear wall) are filled with appropriate thickness, two-pound, high-density expanded polystyrene to provide an insulated body structure with an R-value of at least R-6.
- H. The steel sub-floor is a fixture-welded structure of minimum 2" x 4.8" 12 GA steel G-channel cross-members and 1" x 3-1/2" 12 GA steel C-channel, treated for corrosion protection. The sub-floor is covered with 3/4" marine grade plywood, attached with a high-strength exterior adhesive and self-tapping, countersunk screws. Prior to installation, the edges of the plywood are sealed with an anti-wicking solution to seal out moisture. All seams in the plywood floor are filled with wood filler and sanded smooth before installation of floor covering material.
- I. The floor is designed so that all the steps required to enter the passenger cabin are integrated into the main passenger stepwell. There is no additional transition step beyond the main stepwell. An additional step will be integrated into the stepwell to allow for the interior floor of the bus to be raised with no wheelwells.
- J. The body is bolted through the sub-floor structure to the chassis frame and utilizes rubber isolating mount pads and Grade 8 7/16-14 UNC bolts torqued to 60-65 ft-lbs. No part of the body is welded directly to the chassis frame structure.
- K. A front cap constructed of fiberglass and reinforced with a steel frame structure to provide strength and prevent drumming encloses the front end of the body over the cab area.
- L. The exterior sidewalls of the bus are smooth with no exposed fasteners. All nuts, bolts, clips, washers, clamps and like fasteners are zinc or cadmium plated, or zinc chromate coated, or stainless steel to prevent corrosion.
- M. Wheel housings are of one-piece, steel construction, 14 GA minimum, and treated with an anti-corrosive primer. Wheel housings are constructed and adequately reinforced to prevent deflection. Ample clearance is provided for tires in their maximum jounce position according to the chassis manufacturer.
- N. Access doors are provided where necessary to service transmission, engine, radiator, and battery.
- O. The entire body under structure is fully undercoated with Z-Tech's Z-Guard 20060-B-2, a rust-proofing blend of petroleum base materials and organometallic complex products, dispersed in petroleum solvents, and sprayed-on according to the chassis manufacturer's guidelines. Prior to this application, the joints where the floors and walls meet, and any other voids, are filled and sealed with non-flammable resin-type material. The undercoating material meets or exceeds Mil-C-62218A and several ASTM standards.
- P. Any bright metal exterior trim is stainless steel, polished aluminum, or chrome plated.
- Q. Water channeling rain gutters are installed over all door and window openings.

### **5.3. Static Load Test**

The bus is certified by an independent testing agency to meet FMVSS 220 (School Bus Rollover) and FMVSS 221 (School Bus Body Joint Strength). Certification of compliance with this static load test is available upon request.

### **5.4. Entry Door Windows**

There shall be one full-height, 14" W x 86.4" H window in each panel of the entry door. They shall be aluminum framed, smoke tinted, with AS-2 rated tempered safety glass. Rear windows shall be fixed to prevent exhaust gases from entering the vehicle. Rear emergency window shall seal out exhaust fumes when closed for normal bus operation.

### **5.5. Door Construction**

- A. The entry door is fully encompassed by an integrally welded steel door surround. The complete door surround is a minimum 16 GA steel and installed in the body as a single unit. The steps are a minimum of 10 GA steel. The door has a full clear opening width of at least 30" and a full height of at least 80" inches.
- B. The entry door is a two-leaf, outward opening type, and controlled from the driver's seat. Each door panel frame is constructed of 6063T6 extruded aluminum with a clear anodized finish. Door panels are fully symmetrical, making them able to be placed in either the forward or aft position.
- C. Full-length, tinted, AS2 glass is provided on the entry door for full visibility. The glass is seated in a gasket and inserted into a slot in the aluminum extrusion for added protection
- D. At the meeting edges of each door leaf, a rubber seal is installed so that the edges form a tight overlapping seal when closed.
- E. An electric powered door is provided and controlled by a switch on the driver's panel. A clearly labeled, emergency over ride control is mounted in the header above the door to allow the door to be opened in case of power failure.
- F. A 1-1/4" stainless steel grab bar shall be securely fastened to both sides of the interior of the doorway parallel to the steps to assist passengers in entering or exiting the vehicle.

### **5.6. Floor Covering**

The floor covering on the steps and main aisle is 3/16" ribbed black rubber. The floor area under the seats is covered with black smooth rubber with radius up to seat track. A 2" white safety nosing is included on each step edge. Step tread is of one-piece construction. The floor covering is butt jointed and securely cemented to the plywood floor with a waterproof adhesive.

### **5.7 Interior Panels and Color**

- A. The interior provides a pleasant, aesthetically pleasing atmosphere. School bus type interior is not acceptable.
- B. Interior walls provide a decorative durable finish that coordinates with the vehicle interior color scheme. Walls and ceiling will be a FRP light gray material. Automotive cloth or carpets are not acceptable interior wall coverings.
- C. The headliner in the main passenger cabin is covered with a light gray fabric that coordinates with the vehicle interior color scheme. The headliner in the driver's cab area is gray padded vinyl. This material helps to dampen noise levels in the driver's area.
- D. All stanchions are 1-1/4" polished stainless steel and securely fastened into steel structural members in the floor and ceiling. Stanchions shall not be mounted to sheet metal, fiberglass or other non-reinforced areas. Stanchion padding will be provided on all stanchions including the entry grab rails.
- E. A vertical stanchion and padded modesty panel are installed in the entryway at the rear of the step well and behind the driver. A plexiglass will be mounted to the top portion of the driver's modesty panel. All modesty panels are covered with padded vinyl.

- F. Vinyl padded panels cover the door headers and wiring channels where the sidewalls meet the ceiling.
- G. Overhead grab rails, 1-1/4", parallel to the aisle are installed on both sides of the vehicle. These grab rails are securely fastened to the roof bows or to strategically placed steel backers welded into the roof structure. A white standee line in floor with 2" sign "No Standing Forward of White Line" will be mounted above driver's head.
- H. An adjustable driver's sun visor is provided.

#### **5.8. Bumpers**

- A. The vehicle front bumper is a full width OEM bumper, chromed.
- B. The rear bumper shall be a black energy absorbing type.
- C. Bumpers are fastened directly to the chassis frame to allow shock from impact to be transmitted to the chassis frame.
- D. 3M 3" Diamond Grade red and white tape shall be mounted to both front and rear bumpers.
- E. Rear tow hooks to be provided.

#### **5.9. Seating**

A High Back Reclining Driver's seat to include right hand arm rest, lumbar, and map pocket will be provided

Twelve Citi Seat fiberglass shell only seats to be forward facing will be provided. Each seat will have an antivandal top mounted grab rail. Citi Seat three step foldaways will be mounted in the wheelchair area. The foremost flipseat will have antivandal top mounted grabrails for aisle and window seat. A minimum of 90" non-retractable seat belts will be mounted for passenger use.

All seating installed in this vehicle is in compliance with FMVSS 207 (Seating Systems). Any associated seat belt assemblies are in compliance with FMVSS 209, 210 (Seat Belt Assemblies, Seat Belt Assembly Anchorage's).

Standard fixed seats are installed in seat tracks that are welded to the floor and sidewalls. Seat tracks allow for seats to be re-positioned as needed. A black plastic insert snaps into the seat track between seat legs.

Wherever seats are installed in the bus, sufficient steel is welded into the floor structure to allow the seats to pass all required FMVSS/CMVSS standards. Securement of seats into plywood alone is insufficient.

#### **5.10. Passenger Cabin Glass**

- A. The side passenger windows are transit type, as opposed to the school bus type. The passenger windows are certified by an independent testing agency to be in compliance with FMVSS 217 (Bus Window Retention and Release). Passenger windows must be capable of opening to ensure ventilation. Windows are an upper T-Slider design.
- B. Hinged emergency escape windows are provided on each side of the bus. In addition, a rear hinged emergency escape window with a minimum 11" x 14" Wide Angle Lens will be provided. Emergency windows are clearly labeled and operating instructions are clearly visible. All egress windows are identified with a red LED light that is illuminated during vehicle operation. An emergency window ajar package will be provided to notify driver. An indicator pad will be provided near dash for driver's view to identify the open window.
- C. All passenger windows are safety glass with an AS-3 marking. Windows are dark tinted to a maximum of 31% light transmission. All passenger windows are installed in black powder coated or anodized aluminum frames, or an equivalent. Each side window shall be a minimum of 36" tall by 36" wide, except where the floor plan requires the use of one or two 24" wide windows on each side.

## **6.0. ADDITIONAL SYSTEMS, EQUIPMENT, ACCESSORIES & SUPPLIES**

### **6.1. Exterior Color**

A full body paint with the exception of the roof (color will be provided after award) and a black painted skirt will be provided. Vinyl decals will be installed to give the appearance of a Trolley. Lettering instructions will be provided after award.

### **6.2. Safety Equipment**

- A. Each vehicle will be equipped with a first aid kit, a fire extinguisher and three triangle reflectors.
- B. A Specialty Prolo with outside handle and buzzer or approved equal will be provided.
- C. Sonar Back up alarm will be provided.
- D. A back up alarm will be provided.
- E. "Watch Your Step" Mounted on each Riser.
- F. A back up camera with a 7" color monitor mounted in the driver's area will be provided.

### **6.3 Mud Flaps**

Mud flaps shall be installed on the front and rear wheels. Rear mud flaps are positioned and secured in a manner that prevents contact with exhaust components or with the wheels.

### **6.4. Wheelchair Securement Area**

- A. Two Q Straint QRT Max system with slide n click Q-8300-A1-SC with retractable lap and shoulder combo belt with height adjustment. Two extra slide and click pucks in the floor to accommodate one larger wheelchair.
- B. Wheelchair Securement areas have a clear floor area of at least 30" by 48". (ADA 28.23 d.2)
- C. Wheelchairs must be secured in a forward facing position. (ADA 28.23 d.4)
- D. Wheelchair Securements include a seat belt and shoulder harness for the wheelchair occupant. These belts are not to be used in lieu of a device that secures the wheelchair itself. (ADA 38.23 d.7)
- E. Interior Priority Seating Wheelchair Area mounted on walls and an Exterior International Decal ship loose will be provided. American Disabilities Act (ADA) regulations shall supersede all requirements included in these specifications.

### **6.5. Wheelchair Lift Equipment**

- A. Braun Century Series 2 NCL 919 platform wheelchair lift shall meet applicable ADA and NHTSA regulations, plus FMVSS 403 and 404. The wheelchair lift shall include a platform with a minimum clear width of 34" and minimum clear length of 51". The wheelchair lift shall incorporate an emergency method of operating if the power to the lift fails. The wheelchair lift shall include handrails on both sides of the platform. (ADA 38.21)
- B. The wheelchair lift controls shall be interlocked with the vehicle transmission to ensure that the vehicle cannot be moved when the lift is not stowed. (ADA 38.23 b.2)
- C. Double wheelchair lift doors with windows shall provide a minimum clear opening height of 68".
- D. Illumination of the wheelchair lift platform shall be achieved by lights mounted on the lift itself as well as two exterior lights located below window level and shielded to protect the eyes of entering and exiting passengers. (ADA 38.31)
- E. Wheelchair lift doors shall incorporate a light on the dash to indicate that the doors are not closed. An interior light shall activate when the door (s) are open to illuminate the wheelchair area from above the lift.
- F. An Intermotive Gateway fast idle and interlock system will be provided.
- G. American Disabilities Act (ADA) regulations shall supercede all requirements included in these specifications.

## 7.0 QUALITY AND CERTIFICATIONS

### 7.1 Manufacturer's Quality Standards

A "Fully Meets" rating under Ford Motor Company's QVM quality program certification must be provided at time of bid.

### 7.2 ISO

An ISO 9001-2000 certification must be provided at time of bid.

### 7.3 Altoona Testing

A 4yr/100,000 mile Altoona test that meets the Surface Transportation and Uniform Relocation Assistance Act (STURRA). Test summary results must be provided at time of bid

### 7.4 FMVSS Certification

All applicable Federal Motor Vehicle Safety Standards. A complete list must be provided at time of bid.

## **APPENDIX A: GENERAL DIMENSIONS**

8.1	PASSENGER SEATING CAPACITY	12 Fixed Seats, 4 Passenger Flipseats
8.2	OVERALL LENGTH	276" Minimum
8.3	OVERALL WIDTH (not including mirrors)	93" Minimum
8.4	OVERALL HEIGHT	115"
8.5	INTERIOR WIDTH	90 3/8" Minimum
8.6	INTERIOR HEIGHT	75" with flat floor Minimum
8.7	STEP HEIGHT FROM GROUND	11.5" max
8.8	RISER HEIGHT	9" (7 1/2" with flat floor)
8.9	ENTRY DOOR DIMENSIONS (Clear)	30" x 80"
8.10	WIDTH OF AISLE	16.5" W/O ARM RESTS
8.11	GVWR	14,500 LBS
8.12	WHEELBASE	158"

### **9.0 Propane Conversion**

- Ford E-450 bi-fuel LPG shuttle bus
- Propane vehicle systems must be Bi-Fuel Liquid Injection Propane with a Liquid Injection Propane tank with accessible fuel pump that allows service and/or replacement of the fuel pump without draining the propane tank.
- System must be EPA Certified and installed by a Ford Qualified Vehicle Modifier (QVM) installation facility.
- Vehicle must have Ford's Gaseous Fuel Prep Engine option.
- Minimum 33 gallon bi-fuel LPG system
- Aftermarket warranty on engine must be provided

### **10.0 Camera Equipment**

- A. Seon Trooper TL 4 Channel, 320GB hard drive with 4 camera heads installed prior to delivery of buses.

