

EXHIBIT 3.5

TRANSIT BUS ALTERNATE FUEL CUTAWAY BUSES TECHNICAL SPECIFICATIONS

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SCOPE

NOTICE: This specification is NOT intended to restrict competition. All vehicles described herein will be used to provide ADA-accessible fixed route, route deviation, complementary paratransit, and/or demand response-type service. Vehicles will be expected to operate daily on all types of roads and in all types of climates. Vehicles will be started and stopped frequently, resulting in demands on the drivetrain, suspension, and braking systems. Components must be the heaviest-duty available in order to provide maximum durability and reliability. Acceptable vehicles will provide safe, comfortable, and dependable operation throughout their useful service life.

The intent of this solicitation is to provide the State with a Price Agreement that includes a wide selection of base models, as it will be utilized by Purchasers of similarly widely ranged resources. Both a “Best Value” and a “Best Quality” model cutaway shall be considered for each of the classes presented.

SECTION 1. GENERAL REQUIREMENTS

1.1 The basic vehicle, consisting of a “Body on Chassis” construction, must be a current year factory production model for which the manufacturer’s published literature and detailed specifications are currently available. The manufacturer shall be ISO 9001:2000 certified. A copy of this certification must accompany all proposals.

1.2 Detailed floorplans with dimensions shall be provided with each proposal, and shall include, at a minimum, the interior layout, seat and wheelchair tie down positions, spacing between ambulatory seats, the vehicle wheelbase, and overall length. A detailed weight calculation of the base model shall accompany each individual floorplan.

1.3 The price quoted in any proposal submitted shall include all items of labor, material, tools, equipment, and other costs necessary to fully complete the manufacture and delivery of the vehicles here specified. The proposer shall not omit any part or detail which goes to make the vehicle ready for service, even if such part or detail is not addressed in this specification.

1.4 All parts, equipment, and accessories shall be new and completely installed, assembled, and/or adjusted as required. All exposed edges and surfaces shall be smooth, free from burrs and other projections and shall be neatly finished. Interior and exterior shall be washed and clean and vehicle shall arrive with a full tank of fuel. This specification is designed to require a complete vehicle of the class described that is constructed within agreed upon timeframes and ready for immediate operation upon delivery.

1.5 Whenever a specific trade or product name is used within this specification, the following statements apply: “... or approved equal with the same standards of quality, design and performance,” and “...if available.” All requests for approved equals must be submitted in accordance with the Request for Pre-Offer Change or Approved Equal or with the Form for Proposal Deviation.

SECTION 2. LEGAL REQUIREMENTS

2.1 The bus shall meet all applicable Federal Motor Vehicle Safety Regulations (FMVSS), Federal Motor Carrier Safety Regulations (FMCSR), and the Environmental Protection Agency (EPA) regulations in effect at the date of manufacture and the Manufacturer shall so certify. Manufacturers must be certified by the National Traffic Safety Administration to manufacture or alter vehicles in accordance with the Code of Federal Regulations, Title 49, Parts 567-568.

2.2 The bus shall comply with all federal, state, and local regulations, including Altoona bus testing certification requirements. The completed bus shall meet all requirements of the Americans with Disabilities Act (ADA) in effect at the date of manufacture, regardless of whether or not all specific regulations are addressed within the details of these vehicle specifications.

2.3 In the event of any conflict between the requirements of this specification and any applicable legal requirements, the legal requirements shall prevail.

SECTION 3. ALTOONA BUS TESTING

3.1 Proposers that are offering CLASS AFB, CLASS AFC, and CLASS AFD vehicles are required to test to a minimum 5 year/150,000 mile service life and to a minimum 7 year/200,000 mile service life for CLASS AFF vehicles in accordance with CFR 49 part 665. Final test report verifying all Federal requirements have been met shall be submitted with any proposal.

SECTION 4. GROUP 4: ALTERNATE FUEL CUTAWAY BUS CLASS DIMENSIONS

4.1 **Group 4** includes four classes of light and medium duty commercial cutaway bus outfitted with a dedicated alternate fuel system. Each class shall be equipped with a curbside, front mounted mobility aid lift and be capable of safely transporting ambulatory and mobility aid passengers in urban and rural environments. A range of dimensions and capacities are given in order to indicate the approximate size and type of vehicles desired. Proposed chassis manufacturers for Group 4 may include Ford, General Motors, International, or Freightliner.

CLASS AFB - Body on Light Duty Van Chassis, 22' - 24'

CLASS AFC – Body on Light Duty Van Chassis, 24' – 26'

CLASS AFD – Body on Light Duty Van Chassis, 25' – 27'

CLASS AFF – Body on Medium Duty Truck Chassis, 30' – 35'

4.2 **Base Models** shall conform to the specified ranges within the following table.

GROUP 4 ALTERNATE FUEL	CLASS AFB E450, G4500	CLASS AFC E450, G4500	CLASS AFD E450, G4500	CLASS AFF FORD, GM, INT, FRT
Wheelbase	158"/159"	176" – 186"	190"/191"	208" - 260"
Gross Vehicle Weight Rating	14,200 to 14,500 lbs.	14,200 to 14,500 lbs.	14,200 to 14,500 lbs.	19,000 lbs. to 26,000 lbs.
Passenger Seats	10 - 14	12 – 16	14 - 18	24 - 30
Wheelchair Positions	2	2	2	2

4.3 **Maximum Exterior Width** shall be **96 inches** (CLASS AFF **102 inches**).

4.4 **Maximum Height** shall be **117.5 inches** (CLASS AFF **120 inches**).

4.5 **Minimum Interior Width** (measured 12 inches above the floor) shall be **90 inches**.

4.6 **Minimum Interior Height** shall be **74 inches**.

4.7 **Maximum Step Height** (from the ground to bottom of first step) shall be **12 inches**. 12 inch max step height does not apply to vehicles optioned for Four Wheel Drive.

4.8 **Overall Length and Wheelbase** of proposed vehicles shall be the minimum necessary to provide the specified number of seats while meeting all applicable FMVSS and chassis manufacturer requirements for weight distribution. The optimal vehicle will exhibit the shortest wheelbase by class while providing the maximum seating capacity available within the specified range. Proposers are required to submit a minimum of one (1) floorplan diagram for each class proposed, showing front lift configuration and maximum available seating. Purchasers shall request detailed floorplan diagrams after Notice of Award based on individual agency needs. As permanent seating modifications, rear lift configuration, and additional wheelchair positions may be required, Proposer agrees to provide accurate pricing for adding and deducting the cost of changes to originally proposed floorplans in order to offer alternatives at a competitive price.

4.9 **Weight Distribution** schematic and loading calculation must be submitted for each proposed floorplan. The weight of a fully loaded vehicle shall in no case exceed the OEM chassis gross vehicle weight rating (GVWR). A fully loaded vehicle equals the weight of a vehicle equipped to meet these specifications, the estimated weight of all occupants (minimum 150 pounds for each ambulatory placement, minimum 250 pounds for each

wheelchair placement) and the weight of a full tank of fuel.

4.9.1 **Four Corner Weight Analysis** shall be performed on every vehicle for GAWR and GVWR evaluation at time of order.

4.1.1 **Weight Certificate** from the purchasing State's state certified scale showing the four corner unladen curb weight of the completed vehicle, with a full fuel tank, must be submitted at time of delivery. Certificate shall be labeled with applicable VIN.

SECTION 5. SPECIFICATION REQUIREMENTS

5.1 Engine shall be the largest available option in a compressed natural gas (CNG) configuration for chassis proposed within the Alternate Fuel Group. Engine shall be chassis OEM gaseous prepped as available, CNG fuel prepped with hardened valves, valve seats, and all other necessary equipment required by the engine manufacturer to operate on CNG fuel, and shall be outfitted with a dedicated CNG fuel system. Gaseous fuel systems shall meet all current applicable FMVSS, NFPA, and OEM Upfitter requirements. All specifications provided shall comply with NFPA 52 and 58. In the event of conflicting specifications, NFPA 52 and 58 shall take precedence. Gaseous fuel system equipped vehicle shall meet all state and federal EPA regulations and be EPA certified. Proposer shall provide required EPA certification with proposal. Proposer shall specify proposed engine type, size/displacement, peak rated horsepower, peak rated torque and fuel system manufacturer and installer. CNG fuel system operation and maintenance training and manuals shall be provided to the Purchaser by the manufacturer to ensure complete working knowledge of the system. Service and parts manuals provided shall identify all gaseous fuel system components along with tank removal and installation methods and any special tools that may be required to prevent damage or injury to tanks, facilities, or personnel. Manuals shall state that the fuel tank must be grounded prior to defueling and/or servicing the system and include a grounding procedure.

Option: An Alternative Fuel Engine, which is the OEM standard for this size bus considering components and accessories proposed, must be provided as an alternative fuel option. Manufacturer shall propose engine horsepower and torque. Proposer shall provide company name(s) and contact information for alternative fuel engine equipment manufacturer(s) and installer(s). Only OEM approved upfitters are authorized to convert engine and components. No plug and play components unless authorized by the OEM

5.1.1 **Magnetic Drain Plug** shall be installed on oil pan if available from OEM.

5.1.2 **Engine Block Heater** shall be Chassis OEM, installed with cord and electrical plug accessible from front of vehicle with hood closed.

5.1.3 **Fittings, Hoses, Tubing, and Fuel Lines** shall be stainless steel or flex tubing approved for use with CNG at 3600 psi. Routing of wire harnesses and fuel lines shall eliminate any potential for pinching or chafing and shall minimize exposure to excessive heat. Heat Shields shall be added for fuel components located within 8 inches of the exhaust system. Components shall be isolated a minimum 8 inches away from unshielded heat sources and minimum 3 inches away if shielded. All lines shall be supported with split block high pressure retaining devices and/or insulated "P" clamps approved for use with

CNG at 3600 psi. Shielding and protective grommets shall be provided wherever hoses, lines, or wiring harnesses penetrate or rub against metal or other sharp or abrasive materials. Insulated “P” clamps shall be installed at 24 inch minimum intervals for support.

5.1.4 Quarter Turn Shut-Off Valve shall be installed to isolate the high pressure fuel storage system. Shut-off valve shall be clearly labeled for ease of identification in emergency situations.

5.1.5 High-Pressure and Low-Pressure Coalescing Filters must be rated for at least twice the maximum flow rate at the minimum expected gas pressure. Filters must be equipped with a manual drain valve that is easily accessible and robust enough to facilitate frequent drainage.

5.1.6 Fuel Fill Panel shall be installed toward the front of the vehicle. Panel shall include an NGV1 3600 psi fuel receptacle, a defueling nozzle with a two position selector valve labeled “Normal Fueling/Defueling Enabled”, and a fuel pressure gauge. An interlock switch shall be provided to prevent starting of the vehicle while the fuel receptacle cover is off. The interlock switch may be installed to fuel panel door if vehicle is so equipped.

5.1.7 Minimum of 40 (CLASS AFF - Minimum 60) Gasoline Gallon Equivalent (GGE) fuel capacity shall be provided for any chassis proposed within the Alternate Fuel Group. GGE Capacity shall be stated in Square Cubic Feet (SCF) @ 3600 PSI. GGE Capacity shall be calculated at 122 SCF per 1 GGE. The maximum number of storage cylinders to provide the largest GGE capacity per wheelbase and GVWR shall be proposed and included in base model pricing. Proposer shall provide tank configuration with chassis proposed and specify total GGE capacity and number and size of cylinders.

5.1.8 Cylinders shall be Type III with electric solenoid valves and twenty (20) year life that complies with NGV2-2016 and FMVSS 303 and 304. Type IV tanks will be considered if installed within the frame rails of the vehicle. All cylinders shall be equipped with manual shut-off valves. All cylinders shall also be equipped with electronic cylinder shut-off valves interfaced to the vehicle fuel module that allow full integration of OEM safety features. All cylinder valves shall have an excess flow device. All cylinders are to be equipped with a pressure relief device (PRD) and vent to top rear of vehicle. Installed cylinders shall show a production date of no more than 24 months from time of delivery.

5.1.9 Steel Dust and Gravel Shields shall be installed to protect tanks and valves. Shields shall be stainless steel or powder coated to protect against rust and designed with proper water drainage. Shields shall be bolted to brackets for ease of installation and removal. Shields shall protect the cylinders from excessive heat.

5.1.10 Automatic Fire Sensing and Suppression System (AFSS) shall be installed, complete with linear thermal fire detectors, control panel, manual activation switch, and fire extinguishing system. At minimum, the AFSS shall provide protection of the engine compartment and battery compartment. Proposer shall specify manufacturer and model information. AFSS Testing and Certification shall be provided by the manufacturer. The test shall determine that the system has been properly installed and will function as intended. Proposer shall supply a certification report at time of delivery. AFSS training and manuals shall be provided to the Purchaser by the manufacturer to ensure complete

working knowledge of the system.

5.1.11 Combustible Gas Leak Detection System shall be installed to monitor engine compartment, fuel storage areas and fuel fill area for leaks. System shall automatically activate audible and visible alarms in the operator's area to alert the driver to trace levels when fumes exceed the specified threshold greater than 20%, and to significant levels when fumes exceed specified threshold greater than 50%, which shall disable the fuel system. The leak detection system shall be compatible with the control panel for the AFSS. Proposer shall specify manufacturer and model information. Leak Detection System Testing and Certification shall be provided by the manufacturer. The test shall determine that the system has been properly installed and will function as intended. Contractor shall supply a certification report at time of delivery. Leak Detection System training and manuals shall be provided to the Purchaser by the manufacturer to ensure complete working knowledge of the system.

Option 1A. N/A for Group 4

Option 1B. Liquefied Petroleum Gas (LPG) Dedicated Propane Fuel System pricing shall be proposed. Engine shall be the largest available option in an LPG configuration for chassis proposed. Engine shall be chassis OEM gaseous prepped as available, LPG fuel prepped with hardened valves, valve seats, and all other necessary equipment as required by the engine manufacturer to operate on LPG fuel. Vehicle shall be outfitted with a dedicated LPG multiport injection fuel system compliant with SAE J2343 and NFPA 52. LPG fuel system shall meet all current applicable DOT, FMVSS, NFPA, and OEM Upfitter requirements. LPG fuel system equipped vehicle shall meet all state and federal EPA regulations and be EPA certified. Proposer shall provide required certification with proposal. Fuel storage shall meet all ASME certification standards. Fill valve shall incorporate a check valve and in-line replaceable fuel filter. The OEM vehicle inertia switch shall be retained to disable fuel pump operation in the event of a collision. Fuel tank assembly shall be equipped with a fill sensor and stop fill solenoid to eliminate over-filling, and a manual shutoff valve and bleeder valve for ease of servicing the system. System shall be equipped with pressure relief and excess flow valves. Proposer shall specify proposed engine type, size/displacement, peak rated horsepower, peak rated torque, LPG fuel system manufacturer and installer, maximum available fuel tank storage capacity in usable gallons, and any required modifications to base model specification. LPG fuel system operation and maintenance training and manuals shall be provided to the Purchaser by the manufacturer to ensure complete working knowledge of the system.

5.2 Transmission shall be automatic, minimum 5 speed, with auxiliary oil cooler.

5.2.1 Magnetic Drain Plug and Reusable Gasket shall be installed to oil pan if available from chassis OEM.

5.3 Chassis shall meet or exceed minimum specifications outlined in Section 4.

5.3.1 Modifications shall comply with FMVSS. Manufacturer must be certified by the National Traffic Safety Administration to manufacture or alter vehicles in accordance with the Code of Federal Regulations, Title 49, Parts 567-568. On "cutaway" conversions, added bodies must be securely fastened to the basic vehicle structure and bolted securely through chassis rail flange at floor and with added reinforcing plates or comparable method

conforming to chassis OEM body builder's requirements.

5.3.2 Differential Gear Ratio shall allow for sustained highway cruising speeds as well as easy acceleration from an inclined stop in mountainous terrain. Proposer shall specify ratio of proposed chassis.

Option 2. Limited Slip Rear Axle pricing shall be provided for OEM chassis incorporating LS Rear axle. Proposer shall specify differential gear ratio.

Option 3A. 4WD Conversion pricing for an outfitter such as Quigley Motors, including vehicle transport/shipping, shall be proposed.

Option 3B. Ford OEM 4WD Chassis pricing shall be provided if qualifying Ford F-series chassis is proposed.

5.3.3 Driveshaft, bearings, and u-joints shall be OEM standard for proposed chassis GVWR. One or more protective metal guards shall be installed to prevent any section of the driveshaft from striking the ground, contacting brake or fuel lines, and/or penetrating the body of the vehicle in the event of a failure, in accordance with 49 CFR Part 393.89.

Option 4. Driveline Retarder pricing shall be provided for an electromagnetic driveline retarder such as Telma to be installed according to manufacturer's requirements. Multistage activation shall be triggered by application of service brakes. Proposer shall specify wheelbases or options that may potentially obstruct installation.

5.3.4 Suspension Frame Height shall be equal on both sides of the vehicle. Shims or comparable methods shall be used on curbside of vehicle to compensate for extra weight of mobility lift and to keep bus level.

5.3.5 Shock Absorbers front and rear shall be highest rated OEM available.

5.3.6 Front and Rear Springs/Airbags shall match GAWR capacity and have a ground load rating equal to or exceeding GVWR.

5.3.7 Rubber Leaf Suspension System such as MORryde shall be installed as an upgrade to the OEM rear suspension according to manufacturer's exact requirements. System shall maintain a level position once loaded to full capacity without affecting ride quality.

Option 5A. Rear Air Suspension System such as Kelderman 2 Stage shall be proposed with delete and credit pricing for the Rubber Leaf Suspension System.

Option 5B. N/A for Group 4

5.3.8 Exhaust shall be a heavy duty, corrosion resistant system that meets or exceeds FMVSS, State of Colorado, and EPA noise level and exhaust emission requirements. Exhaust shall exit bus to streetside rear. Bottom of tailpipe shall terminate a minimum 12 inches above ground level. Window immediately above outlet must be fixed. Heavy duty exhaust hangers shall be standard equipment and bolted to the frame. All hanger U-bolt

thread orientation must be directed sideways. All exhaust system modifications shall use the exact type, size and gauge material as OEM exhaust system. At a minimum, there shall be three (3) tailpipe hangers.

For vehicles purchased from the State of California: emissions must also meet California Code of Regulations (CCR), Title 13 – Motor Vehicles, Section 1961, Exhaust Emission Standards and Test Procedures – 2004 and subsequent Model Passenger Cars, Light Duty Trucks, and Medium-Duty Vehicles, and California Air Resources Board Regulations. Vehicle engine and fuel system must have Certified California Emissions; Documentation must be provided prior to award.

5.3.9 Steering shall be OEM power-assisted and incorporate tilt-wheel feature. Once vehicle is built complete and at full curb weight, it shall receive a full front-end alignment per chassis OEM guidelines for caster, camber, and toe. Any repairs required to bring alignment settings within the adjustable range shall be completed prior to delivery. A printout with contact information shall be provided from the alignment shop, showing chassis VIN and settings before and after alignment. Contractor shall provide the alignment specification sheet at time of delivery. If the alignment specification sheet cannot be produced at delivery, Contractor shall make arrangements to have the vehicle aligned locally.

5.3.10 Service Brakes shall be chassis OEM ABS power-assisted disc brakes meeting FMVSS 49 CFR 571.105 and Colorado Motor Vehicle Safety Standards.

5.3.11 Parking Brake shall be foot operated with a warning light on the dash. Parking brake shall be factory installed in the rear braking system and not lock on the driveline.

5.3.12 Wheels shall be steel OEM, rated to meet or exceed GVWR. All 7 (6 + 1 spare) shall be painted white to match bus finish and interchangeable.

5.3.13 Air Valve Extensions shall be installed on dual rear wheels.

5.3.14 Front and Rear Mud Flaps shall be installed clear of suspension and exhaust components. Clearance between rear tires and flaps shall be sufficient to allow for installation of snow chains.

5.3.15 Tires shall be All Season radials of equal size and rating with an M+S (mud and snow) designation to meet Colorado's winter Traction Law (Code 15). All 7 (6 + 1 mounted spare) shall be largest OEM recommended size for wheels and GVWR specified. Combined load rating of 6 mounted tires shall equal or exceed GVWR of vehicle. Spare tire shall be mounted to spare wheel and shipped loose with vehicle unless spare tire carrier is optioned. All mounted tires shall be electronically spin balanced. Proposer shall specify manufacturer, model, and size of tires offered with proposed chassis.

Option 6. Spare Tire Delete and credit pricing shall be proposed.

Option 7. Drop Down Tire Chains pricing shall be provided.

Option 8. Spare Tire Carrier pricing shall be proposed for available front, rear, or under-mounts. Proposer shall specify model, specification, or option conflicts that may obstruct installation. Purchaser shall approve mounting location at time of order.

5.3.16 **Fuel Tank** configuration proposed shall be largest capacity GGE available for chassis offered, and installed as specified in Sections 5.1.4, 5.1.5, 5.1.7, 5.1.8, and 5.1.9. Proposer shall specify storage capacity, cylinder type, and layout.

5.3.17 **Fuel Filler Panel** shall be installed as specified in Section 5.1.6.

Option 12. Locking Fuel Panel Door pricing shall be proposed. Purchaser shall specify keyed lock or thumb latch at time of order.

5.3.18 **Bumpers** shall be installed front and rear. Front bumper shall be chassis OEM. Rear bumper shall be steel, painted black, and installed to the frame using heavy duty brackets and Grade 8 bolts.

Option 10. Front Safety Bumper such as Romeo Rim HELP energy absorbing bumper pricing shall be provided.

Option 11. Rear Safety Bumper such as Romeo Rim HELP energy absorbing bumper pricing shall be provided.

Option 12. Bumper Anti-Ride Shield installation pricing shall be proposed.

Option 13. Reverse Assistance System pricing shall be provided for sensor and alarm system such as Hawkeye.

Option 14. Backup Camera System pricing shall be provided for rear mounted camera with Color Monitor.

Option 15. Rear View Mirror W/Integral Display and backup camera w/night vision pricing shall be provided.

5.3.19 **Two Rear Tow Hooks** shall be installed to the frame and permit towing of the vehicle without distortion or failure.

5.3.20 **Daytime Running Lights (DRL)** shall be chassis OEM.

5.3.21 **Engine Hour Meter** shall be installed if not provided by chassis OEM.

5.3.22 **Cruise Control** shall be chassis OEM.

5.3.23 **Windshield Wipers** shall be chassis OEM adjustable speed intermittent wipers.

5.3.24 **Horn** shall be chassis OEM.

5.3.25 **Stereo** shall be chassis OEM standard AM/FM/CD with clock. 2 front speakers shall be located in the cab section and a minimum 4 rear speakers will be installed in the passenger compartment.

Option 16. OEM Stereo Delete and credit pricing shall be provided.

5.3.26 **Driver Side Sun Visor** shall be chassis OEM and match interior.

5.3.27 **Rearview Mirror** shall be chassis OEM unless optioned for integral back up camera display.

5.3.28 **Interior Passenger View Mirror** with 6x9 inch nominal dimensions shall be installed above the windshield. Mirror angle shall be adjustable to provide driver with full view of passenger compartment.

5.3.29 **Exterior Mirrors** shall be remote-operated, adjustable, and heated by 12-volt defroster grids. Support frames and mounting hardware shall have a corrosion resistant finish. Mirrors shall comply with SAE recommended standards and 49 CFR 393.80.

Option 17A. Side Mirrors With Rear Looking Cameras pricing shall be proposed. Pricing shall include adapting video feeds into an optioned camera system.

Option 17B. Composite Side Mirrors pricing shall be provided for mirrors such as Velvac 2020.

Option 17C. Composite Side Mirrors W/Cameras pricing shall be provided for mirrors such as Velvac 2020.

5.3.30 **In Dash Heater/Defroster** shall be Chassis OEM.

5.3.31 **In Dash Air Conditioner** shall be Chassis OEM.

5.4 Auxiliary Heater shall be floor mounted and located under the seats in the passenger compartment. System shall maintain a range of 65°F to 70°F with an ambient temperature of 0°F. Controls shall be independent of in dash heater, with a three position, (OFF/LOW/HIGH) selector switch. Heater shall meet SAE recommended standards and practices and comply with applicable criteria of 49 CFR 393.77. Proposer shall specify rated output of proposed unit in BTUs. Purchaser shall approve placement of auxiliary heater at time of order.

Option 18. Additional Auxiliary Heater installation pricing shall be provided. Each individual heater shall be operated by a separate selector switch.

5.4.1 **Silicone Heater Hoses** shall be installed and equipped with quarter-turn shut off valves. Shielding and protective grommets shall be provided at any point hoses penetrate or rub against metal or other sharp or abrasive materials. Insulated "P" clamps shall be installed at 24 inch minimum intervals for support.

5.4.2 **Circulation Booster Pump** shall be installed as required. Activation shall be regulated by auxiliary heater selector switch.

5.4.3 **Electric Heater Control Valves** shall be installed in supply and return lines. Activation shall be regulated by auxiliary heater selector switch.

Option 19. Vacuum Operated Shut-Off Valve pricing shall be provided for installation in heater supply and return lines in lieu of electric valves.

5.5 Auxiliary Air Conditioning system proposed shall be a dual compressor climate control unit capable of reducing passenger compartment temperature from 100°F to 70°F(+/-5°) within 30 minutes of system engagement. System shall maintain a range of 65°F to 70°F, measured 12 inches above floor level, with an ambient temperature of 90°F. Performance evaluation data confirming the specification shall be supplied with the proposal. A/C system shall be separate from OEM chassis A/C system but utilize same refrigerant type. Controls shall be located within easy reach of driver and installed independent of OEM chassis HVAC controls. Evaporator and condenser shall be matched to compressor as per system manufacturer's requirements. Proposer shall specify manufacturer, model, and rated output of all proposed systems.

5.5.1 Evaporator shall be mounted to roof bows at rear wall of bus. Drains shall run downhill from evaporator housing and discharge below floor level. Any exposed drain lines, refrigerant hoses, or gaps between evaporator cover and rear wall shall be properly covered with smooth-trimmed close out panels matching bus interior.

5.5.2 Refrigerant Hoses and wire harnesses that pass within 12 inches of exhaust system shall be shielded from heat damage. All hoses must be installed a minimum of 6 inches away from catalytic converter and 4 inches away from exhaust pipes and muffler. Shielding and protective grommets shall be provided at any point refrigeration or drain lines penetrate or rub against metal or other sharp or abrasive materials. Insulated "P" clamps shall be installed at 24 inch minimum intervals for support. Hoses and fittings must meet SAE specification J2064.

5.5.3 A/C System Information Label shall be located in the engine compartment. Label shall detail installation date, system manufacturer, evaporator model, refrigerant type and quantity, compressor model, and compressor oil type and quantity.

Option 20A. Air Conditioning Delete and credit pricing shall be proposed.

Option 20B. Roof Mount HVAC pricing shall include installation of overhead, center mount system such as Thermo King SLR. Proposer shall specify applicable model and rated output.

Option 20C. "Cool Only" Roof Mount System pricing shall include installation of overhead, center mount A/C only system such as Thermo King. Proposer shall specify model and rated output.

5.6 Electrical System shall be a 12-volt, negative ground, alternator-powered system. OEM chassis wiring shall remain unchanged as much as specification requirements allow. All OEM chassis functions energized through the ignition switch shall remain as installed.

5.6.1 Master Battery Disconnect Switch shall be provided to energize all bus body electrical power other than exterior lights. Ignition hot and battery hot body power shall be routed through the master battery disconnect switch. Body electrical components and

functions shall not operate if master switch is in OFF position. Body components activated by ignition hot power shall not operate unless both master switch and ignition switch are in ON position. Proposer to specify short list of available master battery disconnect switch locations for each model. Purchaser shall specify master switch location preferences at time of order.

5.6.2 Electrical Compartment shall be located above driver's position and easily accessible through a latching access door. Compartment shall contain all bus body power electrical junction boxes, breakers, relays, and controls. Size of compartment shall allow for ease of maintenance and component repair. A minimum of 4 unused, 30 amp maximum breaker slots shall be provided to accommodate installation of additional electrical components. An "As Built" wiring legend identifying circuit functions and breaker positions shall be laminated and secured to inside of access door.

5.6.3 Manual Reset Circuit Breakers shall be provided in lieu of fuses.

Option 21. Standard Blade Fuses shall be proposed in lieu of manual reset circuit breakers, with delete and credit pricing.

5.6.4 Wiring shall conform to latest revised versions of SAE standards J1127 and J1128. Insulation material shall be selected for the maximum ambient temperature of its on-vehicle environment per table 1 of SAE standard J1292. Wiring shall be color-coded and permanently heat or ink stamped at a minimum of six inch intervals with circuit identification or function codes. Each wire's color, gauge, and code identification shall be referenced on electrical diagrams encompassing all installed electrical systems and their connections to chassis OEM electrical systems. Wiring shall be continuously enclosed in non-metallic loom meeting current SAE standard J562, and be adequately supported and routed for protection from heat, moisture, solvents, corrosion, road debris, abrasion and tension. Wiring shall be of sufficient length to permit proper positioning as well as replacement of terminals at least twice without creating excessive tension. Wiring specifications shall apply to alternator, battery, HVAC system, mobility lift, and all other electrical components.

5.6.5 Protective Grommets shall be installed at any point wiring harnesses penetrate or rub against metal or other sharp or abrasive materials.

5.6.6 Interior Body Harnesses shall be joined using pin and socket plug connectors such as Molex.

5.6.7 Exterior Wiring Harnesses shall be joined using plug connectors sealed against the elements, such as Deutsch or Weather Pak. The use of splice-in connectors such as Scotch Locks will not be acceptable.

5.6.8 Wires Larger than 10 Gauge shall be properly crimped, soldered, and sealed with heat shrink tubing. Connections made by hydraulic or connector fusing crimp tools shall be acceptable in lieu of soldering. The use of butt connectors will not be acceptable.

5.6.9 Battery Cables shall be minimum No. 4 AWG type SGX meeting current SAE

standard J1127. Battery cables installed in place of chassis OEM battery cables must be a continuous run and sized to exceed maximum draw.

5.6.10 **Three Added Grounds** of 1/0 or 0 gauge cable shall be installed between (1) engine and OEM chassis frame, (2) cutaway body frame and OEM chassis frame, and (3) mobility lift pump housing and auxiliary battery. Cables shall be of a continuous run. Splices will not be acceptable.

5.6.11 **“As Built” Wiring Diagrams** and schematics shall be provided in manual form with each vehicle order. At a minimum, diagrams shall include wire color and identification codes, all bus body electrical functions and components, and connections to OEM chassis electrical harnesses. Diagrams shall specifically match the constructed vehicle and all selected options. General, nonspecific wiring diagrams will not be acceptable.

5.6.12 **Alternator** shall be chassis OEM with a minimum 220 amps. 110-190 amp dual alternators shall also be considered. Proposer shall specify alternator type and amperage rating for chassis proposed.

5.6.13 **Voltmeter** with needle gauge shall be installed in Driver’s Compartment and wired to battery hot body power.

5.6.14 **Fast Idle** activation shall be regulated by a combined high idle/lift interlock device such as Intermotive Gateway. Engine idle speed shall increase to 1500 RPM and shall engage only when vehicle is in park, parking brake is applied, and service brake is released. Fast idle shall automatically activate if charging system voltage drops below 12.5 volts, in dash A/C is switched on, auxiliary A/C is switched on, or auxiliary heater is switched on. Idle shall return to normal whenever service brake pedal is applied, parking brake is released, transmission is taken out of PARK, or manual override is selected on LED display panel.

5.6.15 **Dual Batteries** shall be largest capacity chassis OEM with a minimum rating of 1300 CCA combined. Battery terminals shall be coated with anti-corrosion protectant. Proposer shall specify manufacturer, type, and CCA rating of batteries proposed.

5.6.16 **Battery Box** shall contain both batteries, the high-amperage mobility lift circuit breaker, and all other high-amp body power circuit breakers, in a curbside weatherproof compartment. Bottom of box shall extend no lower than bottom of entry door. Battery box shall include a slide-out tray with drain holes in both tray and box that align while locked in stowed position. Battery cables shall be of sufficient length and routed to allow for full travel of slide out tray, and shall be protected and flexible enough to fold away when stowed without shorting or damaging the cables. Tray slides shall be heavy-duty stainless steel and box, tray, and battery hold-downs shall be constructed of corrosion resistant materials. Battery box access panel shall be top-hinged and lockable. A spring latch shall be installed to hold access panel in an open position for service and a diagram showing battery power circuit configuration shall be installed to the inside of the panel. Purchaser shall specify preference for keyed lock or thumb latch securement of access panel at time of order.

Option 22. Alternate Battery Location pricing shall be proposed to locate one battery in battery compartment and one battery in engine compartment. Proposer shall specify if option to locate both batteries in engine compartment is available.

Option 23. Stepwell Battery Compartment pricing shall be proposed to locate both batteries beneath entry steps. Proposer shall specify details of compartment construction and provide description of mechanism used to secure removable cover step.

5.6.17 **Driver Control Console** incorporating body electrical component and function switches and warning lights shall be installed within easy reach of driver. Console shall be attached with nut and bolt fasteners (no self-tapping screws) with a removable access panel. Console wiring harnesses shall be equipped with detachable connectors for ease of removal and service. Overhead console mounting will not be acceptable.

5.6.18 **Two 12-Volt Power Points** shall be located in Driver's Compartment. One or both may be chassis OEM. Power points shall be installed if two are not pre-existing.

5.7 Exterior Lights shall all be voltage-regulated, light-emitting diode (LED) type. Exterior lights shall operate regardless of master battery disconnect switch position, and shall meet all State of Colorado and FMVSS/DOT requirements and specifications. Exterior light configuration shall include amber front marker lights, amber side marker/turn signal lights, amber rear turn signal/hazard lights, red rear clearance lights, red brake/taillights, red high mount stop lamp, and clear reverse lights. Operation of marker, clearance, tail, and license plate lights shall be controlled by OEM chassis headlight switch. Four-way flashers for hazard indication shall be wired together with turn signal indicators. Proposer shall provide detail of proposed rear exterior light configuration.

5.7.1 **Center High Mount Stop Lamp** shall be an 18" strip or equivalent low profile surface mount light. Stop lamp shall be installed over emergency exit door/window.

5.7.2 **Armored Housings** shall be provided for all marker and clearance lights. Armor shall be rustproofed and painted black.

5.7.3 **Rear License Plate Holder** shall incorporate an LED lamp.

Option 24. Amber Loading Lights shall flash whenever entry or mobility lift doors are open. Lights shall also be activated by driver's console ON/OFF switch. Pricing shall be provided for installing lights to rear of bus. Purchaser shall approve activation method at time of order.

Option 25. Deluxe Fog Lights pricing shall be provided for manufacturer such as PIAA.

Option 26. Underhood Service Light pricing shall be provided for an LED light that shall illuminate the engine compartment whenever the hood is open.

Option 27. Yield to Bus Signal installation pricing shall be provided for 7" Round, red

LED lamp that displays “YIELD” when illuminated. Lamp shall be mounted in the upper rear, streetside corner of bus and shall flash when activated. Lamp shall either be activated directly by a driver’s console mounted ON/OFF switch, or by use of the left turn signal, with an added console cancel switch. A directional yellow “YIELD TO BUS WHEN LIGHT IS FLASHING IT’S THE LAW” decal shall be installed below to indicate lamp above. Purchaser shall approve mounting location and activation method at time of order.

Option 28. Merge Alert Animated Marquee such as the Transpec 7600 series sign pricing shall be provided. Sign shall be mounted to rear of bus. Sign shall either be activated directly by a driver’s console mounted ON/OFF switch, or by use of the left turn signal, with an added console cancel switch. Proposer shall specify any configurations or options that may obstruct installation, such as rear exit door. Purchaser shall specify or approve mounting location and activation method at time of order.

Option 29. Time Delay Shut Off Relay installation pricing shall be proposed for tying the Yield or Merge Alert sign activation circuit into the left turn signal circuit. Applying turn signal shall power sign for 15 seconds. Proposer shall also provide console mounted cancel switch. Purchaser may specify alternate delay interval at time of order.

5.8 Passenger and Interior Lights provided shall all be LED. Lights other than driver’s dome shall operate only when master switch and ignition are in ON position. Passenger area, entryway, and lift loading area shall be illuminated according to CFR 49 Part 38.31. Interior and exterior entryway and lift loading area lights shall be ADA compliant.

5.8.1 Driver’s Dome Light shall activate whenever driver’s door is open.

5.8.2 Interior Courtesy Lights shall be mounted overhead and illuminate the passenger area whenever entry doors are open. Six (6) lights minimum shall be installed on vehicles under 25 feet in length and Eight (8) lights minimum shall be installed on vehicles 25 feet and longer. An ON/OFF switch shall be installed to allow driver to activate lights whenever entry doors are closed.

5.8.3 Interior Stepwell and Exterior Entry Lights shall illuminate the steps in the entry door area, as well as the ground outside, whenever entry doors are open. Lights shall be mounted so as not to create a hazard for boarding and alighting passengers.

5.8.4 Interior and Exterior Lift Door Lights shall illuminate the lift loading area as well as the ground outside whenever lift doors are open.

5.9 Body Construction shall be free of cracks, dents, defects, and physical damage and shall meet applicable FMVSS and Federal Motor Carrier Safety Regulations in accordance with Publication 101-592 and 15 CFR part 280, all fasteners utilized in the assembly and construction of body, sub-assemblies, or components shall comply with all applicable Federal, State and local law ordinances and shall be appropriate for the intended application. Proposer shall certify that all joints and corners where stress concentration may occur are adequately reinforced to fully withstand the required loads and road shock that a vehicle of this type is exposed to. Vehicle manufacturer shall certify that its latest body design and construction methods meet or exceed the requirements of FMVSS 220.

5.9.1 **Exterior Panels** shall have lap joints and exterior seams shall shed water. Sealing of panels shall not depend on caulking alone.

5.9.2 **Flexible Sealant** such as Sikaflex shall be applied wherever sealer is required.

5.9.3 **Fasteners** such as nuts, bolts, clips, washers, and clamps, including those that shall be exposed to the elements, shall be zinc or cadmium plated, phosphate coated, or stainless steel to prevent corrosion. No metal sheet screws shall be permitted.

5.9.4 **Rain Gutters** shall be installed over all windows and doors.

5.9.5 **License Plate Holders**/brackets shall be installed front and rear. All plate fastening hardware shall be provided.

5.9.6 **Roof Construction** shall be of sufficient strength to prevent vibration, drumming, or flexing, and design shall prevent pooling of water. Roof shall meet FMVSS 220 with respect to rollover protection.

5.9.7 **Roof Hatch** such as Transpec 1170 series Triple Value Safety Vent shall be installed to provide rooftop emergency exit and multiposition ventilation.

5.9.8 **Doors** shall be properly sealed to prevent entry of air drafts and water into vehicle interior, including spray from commercial vehicle wash equipment and driving rain. Materials used for weather seals shall be designed to withstand varying temperature extremes, road splash, salt and other exterior elements without leaking or deteriorating.

5.9.9 **2 Complete Sets of Keys** shall be provided. Each set shall include at least one key for each type of lock installed on the vehicle, such as driver's door/ignition, lift door, battery box, fuel door/cap, storage, and entry doors as applicable. Ignition and driver's door shall be keyed alike. All access panel, fuel door, battery box, and ITS storage or overhead door locks of similar design shall also be keyed alike.

Option 30. Additional Complete Set of Keys pricing shall be provided, to include at least one key for each type of lock installed on the vehicle, such as driver's door/ignition, lift door, battery box, fuel door/cap, storage, and entry doors as applicable.

5.9.10 **High Pressure Water Test** shall be performed upon completion of vehicle construction to ensure there are no water leaks of exterior seams, doors, windows, roof, or overall structure. A certification of the water test result shall be provided with each vehicle at delivery.

Option 31. FRP Exterior Skin pricing shall be provided for fiberglass reinforced paneling.

Option 32. Lightweight Interior Paneling pricing shall be provided for composite panels such as Azdel.

Option 33. Undercoating pricing shall be provided. Undercoating shall be a nonflammable resin type polyolefin or equivalent, and shall be applied at time of manufacture. Proposer shall specify type of undercoating proposed.

5.10 Floor Construction shall be specified for each proposed model.

5.10.1 **Sub-Floor** covering shall be minimum 5/8" thick marine grade plywood for CLASS AFB, AFC, and AFD and 3/4" thick marine grade plywood for CLASS AFF. All edges and joints shall be moisture sealed. Sub- flooring shall be filled and sanded smooth.

Option 34. Engineered Wood Flooring pricing shall be provided for proposed model.

Option 35. Floor Underbelly pricing shall be provided. Proposer shall specify material type.

5.10.2 **Floor Covering** shall be provided that is smooth, slip resistant, and ADA Compliant, such as Altro Transflor Meta or Gerflor Tarabus Sirius. Purchaser shall specify floor color from stock selections at time of order.

Option 36. Raised or Flat Floor pricing shall be proposed. **N/A on**

CLASS AFF. Option 37. Ribbed Rubber Flooring such as RCA

Transitflor pricing shall be provided.

5.10.3 **Flooring Edges** shall be welded to provide a completely sealed floor. The floor covering shall not shrink during the service life of the vehicle. Floor material shall be securely bonded to sub-floor with waterproof adhesive in accordance with manufacturer's requirements. All mating edges of flooring, step tread and step nosing materials shall be weather sealed and heat welded to prevent water penetration. The height of the sealant bead shall be consistent with the flooring, step tread and step nosing base thickness. Floor covering shall meet FMVSS 302 addressing fire and flame retardance and smoke suppression, and shall not emit toxic and/or lethal hydrogen chloride fumes if ignited. Floors and sidewalls must shed water for ease of washing and cleaning. Automotive carpet or other water absorbent materials will not be acceptable.

5.10.4 **Cove Molding** shall be one continuous piece along each wall except when interrupted by wheel well, fuel filler tube, mobility lift door, or interior corner covers and door openings. Flooring shall be coved up as one piece from floor level to wall mounted seat rails on both sides.

5.10.5 **Step Edges** shall have yellow step nosing. Tread and step edges shall be bonded into one piece.

5.10.6 **Standee Line** shall be a yellow, 2 inch wide band between passenger compartment and stepwell. Color of line shall match wording on standee sign. Standee line shall always match step edge color.

Option 38. White Standee Line/Sign/Step Edging pricing shall be provided.

5.10.7 **Fuel Pump Access Panel** shall be provided if equipped with LPG Fuel Tank.

5.10.8 **Step Risers** shall be a maximum of 9 1/2 inches high. Step tread shall be a minimum of 8 1/2 inches deep. Tread depth on all steps shall be equal and comply with all regulatory requirements.

5.11 Electric Heated Entry Step shall be provided for de-icing of lowest step. Step heater shall be operated by a console mounted ON/OFF switch. Heater shall only operate with ignition ON.

Option 39. Additional Entryway Heat pricing options shall be proposed.

5.12 Entry Doors shall be electric, dual leaf, outward opening “transit style” with an overlapping safety seal. A thick rubber threshold seal or brush comb shall cover any gap between the lowest part of the door and the mating step surface greater than 3/8”.

Door leaves shall be equipped with full length, tinted, tempered safety glass panes that conform to all applicable Federal and State Motor Vehicle Safety Standards, and provide a clear opening width of 30 inches minimum. Doors shall be operated by a rocker switch located in the driver’s area. Entry door shall not be operable unless the vehicle is in park. Entry doors shall be equipped with an interior safety release mechanism, permitting the doors to be mechanically opened in the case of an emergency. Instructions for emergency release shall be posted adjacent to release handle.

5.12.1 Exterior Entry Door Toggle Switch shall be installed adjacent to doors. Switch shall be wired to battery hot body power. Switch shall operate only with master battery disconnect in ON position.

Option 40. Entry Door Grab Rails pricing shall be provided.

5.13 Rear Emergency Exit Window shall be provided.

Option 41. Rear Emergency Exit Door shall be proposed ILO rear exit window. Door shall have nominal dimensions of 32” x 54” and upper and lower glazed window panes. Exit door shall be tied into the interlock system, and shall illuminate the “DOOR AJAR” LED display and sound an audible alarm to alert the operator when the door is not securely closed and latched. Exit door shall have an interior locking mechanism which shall also trigger interlock system when ignition is switched on with lock in place. Exit door shall have a red, easily accessible interior release handle. Directions for use shall be posted immediately adjacent to handle. Exit door shall also be equipped with exterior latch.

5.14 Mobility Lift Doors shall be located behind the passenger entry door. Lift doors shall be double leaf with a minimum 45 x 68 inch opening.

5.14.1 Glazed Windows meeting all applicable Federal and State Motor Vehicle Safety Standards and ADA requirements shall be installed in each leaf. Lift door windows shall match height and tint of fixed body windows.

5.14.2 Lockable Exterior Handles shall be installed on each leaf.

5.14.3 Gas struts shall be installed at the top of each door to ensure doors remain in an open position whenever lift is in use.

5.14.4 Nylon Limit Straps shall prevent doors from opening past 100 degrees.

5.14.5 **Door Ajar** signal shall be sent to interlock system whenever lift doors are open, triggering the Gateway “DOOR AJAR” warning and audible alarm if transmission is not in park and parking brake is not applied.

5.15 Driver’s Door shall be chassis OEM.

5.15.1 **Driver’s Door Grab Handle** shall be steel reinforced molded plastic. Handle shall be mounted to the exterior of the B pillar, rear of the door.

5.15.2 **Driver’s Running Board** shall be weatherproof, slip resistant, and designed to support 300 pounds without warping. Running board shall extend 10 inches minimum and run the full bottom length of the driver’s door.

Option 42. Running Board Delete and credit pricing shall be proposed.

5.16 Windows and windshield shall meet all applicable Federal and State Motor Vehicle Safety Standards. Windshield and driver’s door window shall be OEM glazed with laminated glass and uniformly tinted. Side windows shall be a flat black, aluminum frame, egress transit type or top T- sliding panel type. A full window shall be provided in the transition panel between the windshield and entry doors to eliminate the blind spot created by the transition panel and enable the driver to fully view the curb and pedestrians from the driver’s seat. Windshield shall be minimum (AS-1), operator’s door window and rear exit door window (AS-2), and all other windows minimum (AS-3) grade safety glass, and shall meet FMVSS 205, 212, and 219. Windows shall be factory tinted with a 31% light reduction.

5.16.1 **Emergency Exit Windows** shall be installed on both sides of the vehicle, with a minimum of two per side. Emergency exits shall be top-hinged, clearly labeled, and have unobstructed openings. Exit windows shall comply with FMVSS 217 and be equipped with an audible alarm system to alert the driver when a window is not completely closed.

5.17 Insulation with a minimum R6 rating shall be provided between interior and exterior wall and ceiling panels. Insulation shall have sound-deadening and vibration reduction qualities and be moisture proof and prevent wicking. Installed insulation shall be fire-resistant, comply with all federal requirements, and shall pass the testing requirements specified in the FTA recommended Fire Safety Practices for Transit Bus and Van Materials Selection.

5.18 Interior finish in the driver’s area shall be a non-reflective material and/or flat grey color. All sharp corners, edges and protruding hazardous surfaces shall be eliminated. There shall be no open seams between trim panels. All panels shall be the same color and match the rest of the interior. All interior panels, finish materials, and treatments shall be flame retardant in conformance with FMVSS 302 and shed water for ease of cleaning.

5.18.1 **Ceiling and Sidewall** panels shall be scuff and scratch resistant.

5.18.2 **Padded, Vinyl Wrapped Headers** shall be installed over mobility lift doors, entry doors and in driver’s compartment.

5.18.3 **Overhead Compartment** shall be used for ITS equipment access or driver storage if no destination sign is selected. Compartment access door shall be as large as available space allows. Purchaser to specify keyed lock or thumb latches at time of order.

5.18.4 **DVR Compartment** shall be installed, with lockable access door, to driver "B" pillar or passenger "A" pillar paneling as space and structure allow.

5.18.5 **Driver's Coat Hook** and retaining strap shall be provided.

Option 43. Upholstered Interior pricing options shall be proposed.

5.19 Vertical Stanchions and Grab Rails shall be 1¼ inch stainless steel and bolted into structural frame members or metal plates.

5.19.1 **Overhead Handrails** shall be provided, and except for gaps at doorways shall run the length of the passenger compartment (handrails shall follow any change in floor height on Low Floor).

5.19.2 **Angled Grab Rails** shall be a minimum 30 inches long, and installed on both sides of the entry way. Grab rails shall not limit clear entry door width.

5.19.3 **Modesty Panels** shall harmonize with interior, both in color and design, and shall not provide a hazard to passengers. Panels are to be "through bolted" to a vertical floor-to-ceiling stanchion and horizontal stanchion-to-wall cross rail. Standard screws will not be acceptable. The upper panels shall be smoked, shatterproof lexan or plexiglass, "shock-mounted" to prevent rattle. The lower padded panels shall be vinyl wrapped, for ease of cleaning. Stanchions, cross rails, and modesty panels shall be located (1) between stepwell and front mounted lift, (2) between lift and front row of curbside seats, and (3) between driver's seat and front row of streetside seats. Stanchion behind driver's seat shall be mounted far enough back that cross rail and panels do not limit rearward travel of seat.

5.20 Seating Configurations shall be approved by each Purchaser prior to production, and must comply with standards established by original seating proposals. This requirement does not preclude other optional seating requests as long as they meet all the requirements set forth in this specification, such as aisle width and hip to knee spacing.

5.20.1 **Seat Dimensions** shall be:

- Seat width per person: 17.5 inches minimum
- Seat depth: 17 inches minimum
- Seat back: 21 inches minimum
- Seat back angle: 10 to 15 degrees
- Hip to knee room: 26 inches minimum (Proposer shall propose maximum available)
- Aisle width: 16 inches minimum (Proposer shall propose maximum available)

5.20.2 **Passenger Seats** shall be Freedman Featherweight Mid/Hi Back. All seats shall have full individual spring suspension as well as contoured full lower back (lumbar) support. Seats shall meet or exceed FTA recommended Fire Safety Practices for Transit

Bus and Van Materials Selection.

5.20.3 **Seat frames** shall be constructed of steel and meet FMVSS 210. Frames shall be bolted to floor and wall mounted positioning tracks. Track mounting shall meet all applicable FMVSS requirements, specifically FMVSS 207. Close-out trim covers shall be installed in all open wall track and between seats in floor track. Floor track trim covers shall lay flush with floor covering to prevent tripping hazards.

5.20.4 **Seat Coverings** shall be Freedman Level 3 fabric. Seat covering and padding shall cover the seat frame and meet FMVSS 302, flammability of interior material. Cushions and seat covers shall be of the slip cover type, removable and replaceable without removing the entire seat. Seat cushions shall be interchangeable. Seat color shall match vehicle interior unless otherwise specified. Purchaser shall specify color (within the guidelines of material type) at time of order.

5.20.5 **Seatbacks** shall be protected by ABS plastic covers. Seats located against rear wall shall not have plastic seatbacks.

5.20.6 **Seat Belts** shall be Freedman USR and bolted to the seat frame assembly. Passenger restraint belts and installation shall meet or exceed all applicable FMVSS standards, including 207, 208, 209 and 210.

5.20.7 **Two 12" seatbelt extensions** shall be provided with each vehicle.

Option 44. Manual Seat Belts shall be proposed with USR delete and credit pricing.

Option 45. Seat Delete and credit pricing shall be proposed for removal of fixed seat.

Option 46A. Fixed Feather Weight Mid-Hi pricing shall be provided for additional seat.

Option 46A. Fixed Feather Weight Hi Back pricing shall be provided.

Option 46B. Fixed Citiseat pricing shall be

provided. **Option 46C. Fixed 3PT Seat** pricing

shall be provided. **Option 46D. Fixed GO Seat**

pricing shall be provided. **Option 47A. Level 4**

Seat Fabric pricing shall be provided. **Option**

47B. Level 5 Seat Fabric pricing shall be

provided. **Option 47C. Level 6 Seat Fabric**

pricing shall be provided.

Option 47D. Level 4 Repel Seat Fabric (Rock) pricing shall

be provided. **Option 47E. Level 6 Repel Seat Fabric**

(Gem) pricing shall be provided. **Option 48A. Citiflip Seat**

pricing shall be provided.

Option 48B. Splitflip Seat pricing shall be provided.

Option 48C. Handiflip Seat pricing shall be provided.

Option 48D. Feather Weight Flip Seat pricing shall be provided.

Option 49A. Double Foldaway Seat BV pricing shall be provided. Proposer shall specify and price proposed models also available as a single seat foldaway. Seats must be installed so that seat cover does not chafe against sidewall during fold/unfold operation.

Option 49B. Double Foldaway Seat AM pricing shall be provided.

Option 49C. Double Foldaway Seat Citiseat pricing shall be provided.

5.21 Driver's Seat shall be powered, premium chassis OEM, with reclining high back, right side armrest, lumbar support, and forward and rearward slide adjustment. Seat upholstery and color shall match fabric and color chosen for passenger seating.

Option 50. Power Seat Base installation pricing shall be proposed for a 6-way adjustable power pedestal if not available from chassis OEM.

Option 51A. Recaro LXS Driver's Seat pricing options shall be proposed.

Option 51B. USSC Evolution G2ELP Driver's Seat pricing options shall be proposed.

5.22 Mobility Aid Passenger Securement system shall be Q'Straint, unless Sure-Lok option is selected.

5.22.1 Occupant Restraints shall be installed at each mobility aid passenger position. Occupant restraint shall consist of a pull-tested, wall mount shoulder belt and lap belt. Fixed wall mount shoulder belts shall not obstruct use of emergency exit windows and shall meet all ADA and applicable FMVSS 403/404 requirements. Successful proposers shall certify that mounted occupant restraints meet or exceed all applicable Federal and State Motor Vehicle Safety Standards.

5.22.2 Wheelchair Securement shall consist of one set of Q'Straint QRT Max retractors and 4 floor attachment points per mobility aid passenger position. Floor anchorage points shall be Q'Straint "L" track, unless Slide'N'Click option is selected. Anchorage points shall be recess-mounted and flush with floor to prevent tripping hazards. Recessed area shall be sealed prior to anchorage installation to prevent water intrusion. Anchorage points shall be secured in accordance with FMVSS 207/208. Successful proposers shall certify that wheelchair securement meets or exceeds all applicable Federal and State Motor Vehicle Safety Standards.

5.22.3 **Alternate Securement System Retractor** configuration shall correspond to anchorage type.

Option 52A. Sure-Lok FF600 pricing shall be

provided. **Option 52B. Sure-Lok AL 700 Titan**

pricing shall be provided. **Option 52C. Sure-Lock**

Titan 800 pricing shall be provided.

Option 52D. Q'Straint QRT-360 pricing shall be provided.

Option 52E. Q'Straint QRT Deluxe pricing shall be provided.

5.22.4 **Anchorage Type** shall correspond to retractor configuration.

Option 53A. Q'Straint Slide 'N' Click (SNC) pucks shall be installed ILO L track.

Option 53B. Sure-Lok L Track shall be installed ILO Q'Straint L track.

Option 53C. Sure-Lok Slide 'N' Click (SNC) pucks shall be installed ILO L track.

Option 54. Full Length Track pricing shall be proposed for L track to be installed in floor and above windows.

Option 55. Scooter Securement System pricing shall be proposed for a five point L track wheelchair securement system. This system would require five parallel tracks. Two in front, three in rear. Fifth center rear track shall be designed to secure a belt/hook around the seat post of the scooter.

Option 56. Additional Mobility Aid Securement Position shall be proposed, to include anchorage points, wall mounted occupant restraint, wheelchair securement system retractors, and single seat delete and credit pricing as applicable.

Option 57. Vinyl Storage Pouch pricing shall be provided to install at each wheelchair position. Purchaser shall specify mounting locations for pouches at time of order.

Option 58. Underseat TDSS (Tie Down Storage System) pricing shall be provided for each foldaway seat in a mobility aid securement position.

5.23 Mobility Aid Lift shall be a Braun Century 2 1,000 lb. capacity lift with 34 x 54 inch platform, rear pump, and handrail belt, p/n NCL1000IB3454HB-2. Lift shall be installed according to manufacturer's exact specifications. Lift shall be located at the front of the vehicle body and mounted so that the inner barrier plate shall not rattle against the vehicle floor or any trim/closeout pieces when stowed. When deployed, there shall be a smooth transition between lift baseplate and passenger area flooring. Any gap in this area can

create a tripping hazard, catch canes, walkers, or even tip a wheelchair. Lift shall meet ADA and FMVSS 403/404 requirements, and shall not operate unless transmission is in park, parking brake is applied, ignition is switched on, and lift doors are open.

5.23.1 **Handheld Lift Pendant Control** box shall be provided with a minimum 5 foot attached cord so that lift may be operated from inside or outside of vehicle. Excess cord must be "P" clamped to interior of lift door in such a fashion that cord does not hang below the doorframe and get pinched by the closing of the doors when properly replaced on its hanger.

5.23.2 **Lift** shall be tested and adjusted between shipment and delivery, and shall be made ready for immediate use upon acceptance by Purchaser.

Option 59. Rear Lift Configuration pricing shall be provided. Lift modesty panel shall be installed between lift and rearmost curbside seat when optioned. Rear lift shall be equipped with a front pump for ease of service access. Pricing shall include any credits or costs from seat deletes or additions.

Option 60A. Braun NVL-2 Vista Series 800 lb. capacity lift pricing shall be

provided. **Option 60B. Ricon Titanium S5510 Series** 1,000 lb. capacity lift

pricing shall be provided. **Option 60C. Ricon Titanium K5510 Series**

1,000 lb. capacity lift pricing shall be provided.

Option 61. Additional Lift Safety Belts pricing shall be provided for installation of belts such as Access-Arize to front and rear of lift platform.

5.24 Lift Interlock such as Intermotive Gateway combined high idle/lift interlock device and "DOOR AJAR" type LED display shall be installed. Interlock installation shall meet ADA Title 49 and FMVSS 403/404 requirements. Alarm shall sound and Gateway "DOOR AJAR" LED display shall illuminate whenever ignition is ON, lift doors are open, and either parking brake is not applied or transmission is not in park, or both. Interlock shall not provide power to lift if lift doors are closed. Interlock shall only provide power to lift if master battery disconnect and ignition are switched ON, transmission is in park, parking brake is applied, and lift doors are open. Interlock shall prohibit shifting out of park until lift doors are securely closed.

Option 62. Intermotive IdleLock pricing shall be provided for installation of keyless secure idle module.

Option 63. Intermotive Pre-Trip Module pricing shall be provided for installation of unit with light cycling and bluetooth CAN data features.

5.25 Safety Equipment shall be provided with every vehicle. Purchaser shall specify mounting locations at time of order. Equipment shall include, but not be limited to:

5.25.1 **Web Cutter** shall be capable of cutting seatbelts and supplied wheelchair

securement straps without exposing cutting edge. Shall not be useable as a weapon.

5.25.2 **Body Fluid Cleanup Kit** shall be provided.

5.25.3 **Two International Wheelchair Access Symbols** shall be 6 x 6 inches minimum.

5.25.4 **Fire Extinguisher** shall be minimum five (5) pound (CLASS AFF minimum ten (10) pound) ABC rechargeable, with gauge.

5.25.5 **First Aid Kit** shall be a 24-unit kit at minimum, and DOT compliant.

5.25.6 **Three Emergency Warning Triangles** shall consist of red reflective and orange fluorescent material. Each side of triangle shall be 17" to 22" long and 2" to 3" wide. Triangles shall be provided in a protective container.

5.25.7 **Backup Alarm** such as ECCO 520 or equivalent shall be installed. Alarm shall register 97 decibels minimum, and shall sound whenever vehicle is shifted into reverse.

5.26 Paint shall only be applied to exterior surfaces that have been properly cleaned and primed as required by paint manufacturer. Painted surfaces shall be impervious to diesel fuel, gasoline, and commercial cleaning agents. Paint shall be high quality acrylic enamel that matches OEM chassis paint scheme. Entire vehicle (excluding windows) shall be OEM white. Exterior seams shall be caulked or sealed with flexible sealant after application of exterior paint to avoid cracking/flaking from seams.

Option 64. Custom Paint and Graphics pricing shall be structured in two tiered categories of price range brackets to categorize the variety of paint and graphic schemes that shall be required by individual Purchaser configurations. Contractor shall propose a price range for the applications detailed within each successive tier in the Paint and Graphics categories. Price ranges for configurations combining tiers from both categories shall be determined by combining the ranges of the applicable tiers from each category and adjusting minimums and maximums appropriately. Purchaser shall provide Contractor with any designs, photos, paint codes, or additional information that may be required to develop a configuration specific quote at time of order, and shall approve elevation diagrams and finalized pricing before purchase order is issued.

5.27 Signs and Decals required by state and federal law shall be provided and installed. These shall include, but not be limited to: emergency exits, standee line, ADA priority seating, etc.

5.27.1 **Emergency Exits** shall be identified with appropriate permanent labeling, including instructions for latch operation and evacuation.

5.27.2 **Roof Clearance** required by vehicle shall be posted in operator's compartment. Necessary clearance shall include height of roof hatch in venting position.

5.27.3 **FMVSS Compliance Decal** shall be posted in driver's compartment stating that vehicle meets all FMVSS regulations.

5.27.4 **Designed To Transport** manufacturer's certification label will state the "Original Seating Capacity - Design To Transport (number of passengers, including driver)" and Gross Vehicle Weight Rating (GVWR) of vehicle.

5.28 Racks shall be installed to bus body structural members or OEM chassis frame. Any current add-on racks proposed shall be considered for inclusion on the available options list.

Option 65. 2 Position Bike Rack pricing shall be provided for models from manufacturers such as Byk-Rak and Sportworks. Proposer shall specify if stainless is a no cost alternative to mild steel. If so, Purchaser shall specify at time of order whether stainless or mild steel is desired. If a cost difference, Proposer shall provide pricing for stainless option. Proposer shall also propose option pricing for Bike Counter Sensor and Quick Disconnect Bracket add-ons, if available.

Option 66. Ski Rack pricing shall be proposed for aluminum based, universal ski/snowboard rack to be installed to curbside exterior of bus. Proposed racks shall hold as many skis/snowboards as possible. Proposer shall specify capacity and dimensions of available models.

5.29 Security and Surveillance System shall include installation of a base 4 camera system with day/night cameras, DVR, event button, minimum 250GB hard drive, and all required management hardware and software. Purchaser shall specify camera interior/exterior view angles at time of order.

5.29.1 **Optional Camera Systems** required to meet Purchaser needs or match pre-existing equipment shall coordinate with Contractor and equipment manufacturer to determine current model pricing and availability at time of order. Installation requirements or equipment orders with extended lead times that shall affect production or delivery timeframes must be proposed and approved at time of pre-production meeting. Contractor shall propose any alternative installation practices and locations as applicable, including any associated differences in pricing or warranty conditions.

Option 67A. Additional Camera installation pricing shall be provided.

Option 67B. Camera System Delete and credit pricing shall be provided.

5.30 Passenger Interface Equipment pricing options shall be proposed.

Option 68. Passenger Stop Request pricing shall be proposed. Controls shall be installed adjacent to seats and wheelchair securement locations for requesting stops. This shall include both audible (chime) and visual (stop request) subsystems. For ambulatory passengers, controls shall be mounted at an easily accessible height. For mobility aid passengers, controls shall be mounted between 15 and 48 inches above the floor. All controls shall be operable with one hand.

Option 69. Public Address System pricing shall be provided. PA system shall tie into the radio system, permitting the driver to announce stops and provide other passenger information. Vehicle shall be equipped with a minimum of four (4) interior speakers and one (1) exterior weatherproof speaker, which shall provide for clear, audible messages. A handheld microphone with volume control shall be provided within easy reach of the driver. The system shall be muted when not in use.

5.31 Electronic Front and Side Destination Sign and front cap view panel installation pricing and options shall be proposed for available systems. Signs shall comply with ADA requirements and be of the largest size the bus will accept. Purchaser shall specify mounting location of sign interface controls at time of order.

Option 70A. Luminator TwinVision Mobilite pricing shall be provided.

Option 70B. Luminator Horizon SMT pricing shall be provided.

Option 70C. Hanover Monochrome LED pricing shall be provided.

5.32 Farebox installation pricing shall be proposed for available systems. Purchaser shall specify mounting location at time of order.

Option 71A. GFI Odyssey pricing shall be provided. **Option 71B. Main Treasury One**

pricing shall be provided. **Option 71C. Main**

Model M4 pricing shall be provided.

Option 71D. Diamond Model XV pricing shall be provided.

Option 71E. Diamond Model SV pricing shall be provided.

Option 71F. Farebox Prewire Only pricing shall be proposed for installation of circuit protected power and ground wires for farebox structure. Purchaser shall specify prewire harness power needs and termination point at time of order.

5.33 Communications, ITS, and Data Systems Options pricing shall be determined at time of order based on individual Purchaser needs. Rapidly developing technologies result in frequent model and accessory updates, and equipment manufacturers shall be consulted to ensure system requirements are fulfilled with the most contemporary products. Purchaser shall specify equipment needs and mounting locations at time of order, and Contractor shall coordinate with Purchaser, bus body manufacturer, and equipment manufacturers to identify current model pricing, availability, management hardware and software, all required adapters and accessories, and compatibility with any pre-existing equipment. Installation or programming requirements or equipment orders with extended lead times that shall affect production or delivery timeframes must be proposed and

approved at time of pre-production meeting. Contractor shall propose any alternative installation/programming practices and locations as applicable, including any associated differences in pricing or warranty conditions.

Option 72. Two Way Radio Antenna Prep pricing shall be provided for a roof mounted ground plane and antenna cable pull tube. Installation shall include an interior access panel directly below the mounting plate. Antenna mounting plate shall be securely grounded to the metal substructure of the bus body with a 12 gauge wire. The cable raceway shall be routed from the mounting plate to the forward destination sign cavity. 2 circuit-protected, 10 gauge ignition hot power and ground wires shall be supplied from the electrical junction box, and routed to the forward destination sign cavity with four (4) feet of additional wire. Purchaser shall specify pull tube and power and ground wire termination location at time of order.

5.34 All Manuals shall be provided with each order at time of delivery. Electronic files shall be stored and delivered on a thumb drive. Specified manuals shall be supplied with each order at time of first delivery.

5.34.1 **Periodic Maintenance and Inspection Schedule** shall be a single comprehensive preventative maintenance manual detailing manufacturer's recommended inspection procedures and service intervals for the supplied vehicle and all serviceable components. The PMI manual shall provide shall place special emphasis on safety related systems, such as regular tire and suspension system inspections, brake system and mobility lift maintenance, and fluid replacement service intervals, as well as all other equipment and sub- systems equipped to the vehicle.

5.34.2 **OEM Chassis Service Manual** shall be provided, and shall include chassis electrical schematics.

5.34.3 **OEM Chassis Operator's Manual** shall be provided.

5.34.4 **Installed Component Manuals** for installed air conditioning, heaters, mobility lift, interlock device, and any and all installed options and components.

5.34.5 **"As Built" Bus Body Parts Manual** cataloging part descriptions and part numbers for all parts used in the construction of the bus body.

5.34.6 **"As Built" Wiring Diagrams** and schematics shall be provided in manual form with each vehicle order. At a minimum, diagrams shall include wire color and identification codes, all bus body electrical functions and components, and connections to OEM chassis electrical harnesses. Diagrams shall specifically match the constructed vehicle and all selected options. General, nonspecific wiring diagrams will not be acceptable.

5.34.7 **Bus Body Operator's Manual** detailing functions and controls for all equipped components and accessories, such as air conditioning, emergency exits, and lift interlock.

5.35 Model and Serial Number Manifest listing of vehicle components shall be provided at time of delivery, including installed accessories. List shall include but not be limited to:

- 5.35.1 **Chassis** make, model, and VIN.
- 5.35.2 **Bus Body** manufacturer, body model, and body number
- 5.35.3 **Engine** make, model, size, and S/N.
- 5.35.4 **Transmission** model, speeds, and S/N.
- 5.35.5 **Air Compressor** model and S/N, if equipped.
- 5.35.6 **Air Conditioning System** manufacturer and model.
- 5.35.7 **A/C Compressor** model and S/N
- 5.35.8 **Interlock Device Control Module** model and S/N.
- 5.35.9 **Interlock Device Display** model and S/N.
- 5.35.10 **Mobility Aid Lift** manufacturer, model, S/N, and lifting capacity.
- 5.35.11 **CNG Fuel Cylinders** model and S/Ns with installation layout diagram.

5.36 Annual DOT Inspection shall be performed before delivery. Inspection report paperwork and certification sticker shall be provided with each vehicle at time of delivery.

5.37 60 Day Temporary Registration Tags of the Purchasing State shall be affixed to each vehicle at time of delivery.