

**ATTACHMENT F**  
**STATE OF SOUTH CAROLINA**  
**TECHNICAL SPECIFICATIONS (ADA BUS 20 x 2 x 1)**

**A. Chassis**

1. Chassis -20 x 2 x 1 (20 fixed seats – 2 w/c positions – 1 driver) Chassis shall be current production year model (i.e., 2022,-2024).
2. 14,500 GVWR minimum, Cutaway with all standard equipment as specified.
3. Vehicle must include as standard the following: Chrome Appearance, Tilt-Wheel, Cruise Control, and largest fuel tank available on each model and configuration. No Standard Features shall be deleted. Each Proposal shall include a listing of all Standard Features, Safety and Security Features and Accessibility Features to be provided as standard on this contract.
4. Fuel Type – Gas
5. Horsepower – 305 minimum
6. Torque – 370 minimum
7. 5-speed automatic minimum
8. Spare tire and wheel (shipped loose)
9. 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.

**B. Dimensions**

1. Wheelbase                               208” minimum
2. Overall length                       330” minimum
3. Overall width                         96” minimum excluding mirrors
4. Inside width                         93” minimum
5. Overall height                       110” minimum
6. Inside height                         78” minimum
7. A steel shield or frame shall be provided to protect the fuel tank, if removed or relocated. There must be a fuel pump access from inside of vehicle.
8. The drive shaft will be rated capable of transmitting the power units to the drive wheels. Safety guards are required as necessary to prevent a broken drive shaft from touching the ground or contacting any part of the frame.
9. The vehicle shall be equipped with street-side exhaust terminating at the left no closer than three (3) feet to the rear bumper
10. The OEM driver’s door will be equipped with a running board assembly with splash guard. The running board will be reinforced to accommodate heavy daily use. The construction will be diamond plate aluminum.

**C. Electrical**

1. Wiring shall be 12 gauge copper strand or equivalent. All wiring shall be color-coded, numbered for identification. All wiring shall be run inside the body in a protected area. Any wiring that is exposed to the elements shall be in nonmetallic loom and securely clipped for maximum protection. Clips shall be rubber or plastic coated to prevent it from cutting through the wiring insulation. Protective grommets shall be installed at all points where wiring penetrates metal and other materials. A separate panel for all add-on components shall be located in an accessible area inside the vehicle. Circuit breakers and electrical panels shall be installed at easily accessible locations. The bidder shall provide a complete laminated wiring diagram showing the original wiring and the added wiring for the vehicle. This is to be mounted at a location convenient for service personnel. No lock wire connectors will be allowed. Insulated stake-on spade terminals or equivalent shall be used. Grounding of components shall be through polarized shielded terminals wired to main structural ground points. All exterior connections shall be weatherproof covered with heat shrink tubing or screw type plug wire connector (Amphenol plug) lock type plug. **Accept approval of manufacture’s standard gauges of wiring.**
2. All accessories and electrical equipment, except head and parking lights, emergency flashers, and wheelchair lift shall be wired through the vehicle ignition switch so as to be operative only with switch in ON ~~or~~ **ACCESSORY** position.
3. Vehicle shall be equipped with a self-contained strobe lamp with a minimum rating of ten (10) joules and double flash and maximum height of six inches (6”). The strobe lamp flash tube shall be warranted for a minimum of twelve (12) months. All other components shall be covered for the full warranty period. The

strobe lamp shall be mounted on the roof centerline within thirty-six inches (36") from the rear of the vehicle. This light shall be wired to operate with the ignition switch and a manual switch on the control panel and shall be protected by a circuit breaker so that a short at the strobe lamp will not adversely affect any other component. A protective guard shall be constructed of stainless steel at a minimum of one and one-quarter inch (1-1/4") in diameter, angled from the front. This guard shall be designed and installed to utilize strobe light mount allowing limbs or low hanging objects to ride over the lamp. There will be two (2) extra wires pulled for the strobe light connection on the roof to panel. All vehicles shall be equipped with a center mount red LED brake light. **Accept approval for strobe light to be stainless-steel branch guard that is shaped to fit around the light like a cage and it provided by the light manufacturer.**

4. Backup Alarm: Minimum sound rating of 95 decibels.
5. Power wire to wheelchair lift shall be securely clamped to lift and protected by in-line circuit breaker.
6. A separate battery system must provide for auxiliary power to the wheelchair lift. Wheelchair battery will have two (2) connections to isolate the battery from the main battery and a separate battery system for the lift. The battery shall be affixed to the frame rail in a skirt mounted battery tray box with a lockable key and signage. Fast idle control box will be installed to maximize charging during lift operation and long-operating times with equipment, A/C, lighting, wheel-chair operating, etc. A **minimum** 225-amp alternator is standard.

#### **D. Interior**

1. Passenger entrance door controllers will be protected from moisture and water buildup. Access to controller and mechanism will be through a hinged access panel. Rear heater will be mounted as far rear as possible.

#### **E. Body**

1. Standard bus body shall meet all stated specifications, State, Federal, FMVSS, Altoona Tested, and ADA. The vehicle shall be reinforced such that the structural integrity of the basic vehicle is not degraded.
2. Vehicles shall meet all applicable requirements of the Americans with Disabilities Act (ADA) as set forth in CFR 37 and 38, issued September 6, 1991, with respect to the body structure.
3. The cage shall be mounted into the chassis by manufacturer approved system and be adequately reinforced at all points where stress concentration may occur to prevent vibration, drumming, or flexing in service.
4. The body shall contain a collapse resistant steel roll cage. The exterior of the body shall be constructed of steel or aluminum, excluding the front and rear end caps. The front caps may be constructed with fiberglass and composite materials.
5. The frame will consist of tubular steel or approved equivalent. Frame must consist of no less than eight (8) stringers (horizontal support) and three (3) longitudinal (running lengthwise) members. The body shall be insulated with a minimum 2" fiberglass blanket or other equivalent fire- resistant insulation material to prevent heat loss in cold weather, and cool air in hot weather. The interior shall be finished with a hard, smooth, cleanable, fiberglass, composite, steel or aluminum liner, not less than 1/16" thick.
6. INSULATION The body shall be insulated as standard with the form insulation package to be applied in roof, side walls, front cap and rear cap surfaces.
7. Body may be composite or fiberglass construction as long as vehicle is compliant with E1 and E2 above and all other certifications contained herein.

#### **F. Roof**

1. The roof shall be completely joined to become an integral part of the basic body. Both outer and inner roof shall be attached to the body in the same manner to prevent leakage. The new top must be completely sealed with an anti-fungal sealant (a sealant that will prevent leaks and fungus buildup). One-piece exterior roof as option. The roof shall be a one-piece (no seams) roof. The new top must be completely sealed with an anti-fungal sealant (a sealant that will prevent leaks and fungus buildup).
2. Minimum of 75" center aisle height.
3. The roof conversion shall meet the FMVSS 220 requirements (engineering documentation should be provided). A certified copy of the FMVSS 220 rollover protection test results for the type of vehicle to be provided must be included with the bidder's documents for the bid to be considered for award.

#### **G. Front Entrance Door**

1. Vehicle shall be equipped with a double leaf front entrance door, located opposite the driver. Door shall be of the hinged type and shall be driver operated electric or manual (option). Door located in front of rear wheels or and behind rear front wheels.
2. The door shall provide a clear entry height of a minimum at least ~~80"~~ **79"**. Clear entry height is measured by using a plumb bob to achieve a true vertical. By placing the line at the top of the door opening, where the bob falls is the "true vertical".
3. The door when extended open shall have a clear opening width of at least 32".
4. Padded head bumpers shall be installed over the entrance door, wheelchair lift and emergency door.
5. Door shall be flush with outside of the bus when in a closed position. Suitable weather stripping shall be

used to provide a water and weather tight seal. Approve Accept that most cutaway bus manufactures provide an entry door that is slightly recessed.

6. A grab rail (minimum of 1-1/4" in diameter) shall be mounted at an angle to the door on each side to provide additional support while loading and unloading.
7. When the front entry door is open, a light shall provide at least 1-foot-candle of illumination on the street surface for a distance of 3' from all points on the bottom step tread. Such light shall be located below window level and shielded to protect the eyes of entering and exiting passengers.

## **H. Lowered Stepwell**

1. The front entrance door shall have a lowered stepwell (minimum of 2 steps below construction of floor level) constructed of corrosion resistant 16-gauge (minimums) steel, or aluminum, or composite material. Stepwell shall be treated with a rustproof coating. All components are to be welded construction or one piece composite.
2. The ground to first step shall not be less than 11" and no higher than 13". There shall be a maximum 9" rise in the steps. Step tread depth shall be a min. of 9" and each step width shall have a clear opening of a minimum at least 18". No protrusions on the step that interfere with a clear passage shall be permitted.
3. Steps shall be fully recessed, enclosed, and protected from weather and other adverse conditions. The width of the lowered stepwell shall not extend more than 2" beyond the widest point on the vehicle body. width of the step edge
4. Stepwell area shall have at least 2-foot-candles of illuminations when engine is running or not.

## **I. Door Opener**

1. An electric, driver operated bus-type extended door opener with positive locking control shall be provided to open and close the front door. The emergency switch shall be an interlocking compression-type and located in the header. Interior passenger entrance door controllers will be protected from moisture and water buildup. Access to controller and mechanism will be through a hinged access panel.
2. The door opener switch shall be placed on the console, but not overhead, and within reach of the seated driver and not to interfere with the boarding passengers.
3. Bidder shall submit door opener drawing and specification with bid.

## **J. Windows**

1. OEM standard windows in the OEM doors and windshield on the basic chassis shall be retained. Glass shall be OEM safety tinted.
2. Windows shall be OEM safety glass and uniformly tinted.
3. Optional horizontal slide-opening type window may be installed in the body side throughout the passenger compartment to provide emergency egress as required by FMVSS.. All windows of the horizontal slide-opening type shall have sashes of the double bay, horizontal slide type equipped with adequate locking features and devices to prevent window sections from moving or sliding by themselves during vehicle stops and starts. "T" type slide passenger windows may be an acceptable alternative to the horizontal slide type windows. Both horizontal and "T" type slide windows shall have drain holes incorporated in the window sash and be constructed to prevent back up or entrance of water into the vehicle. Windows shall be provided with safety and privacy tint. Warning devices must be installed on all emergency windows
4. All windows shall be fitted with durable, firmly installed, weather seals to prevent the entrance of air and water, including spray from commercial vehicle wash equipment, and driving rain. Materials used for weather seals shall be designed to withstand varying temperature extremes, road splashed salt and other exterior elements without cracking, leaking, loosening, or deteriorating.
5. All windows, except windshield, front doors, and rear emergency door, shall be tinted (minimum of 35%) with OEM privacy tint.
6. All windows (including windshield) and tinting shall meet all applicable Federal and State

## **K. Emergency Exits**

1. Hinge-out windows shall be installed for emergency escape. Emergency escape windows shall comply with FMVSS-217.
2. A rear emergency door with upper and lower windows and a positive latching mechanism shall be installed. This door shall have a lock to prevent entry from outside. The vehicle transmission shall not shift out of the park position when the rear emergency door is unlatched. An audible alert capable of 95 dBA and a dash warning light shall be produced any time the emergency door is unlatched with the ignition on.
3. Emergency escape windows shall be clearly labeled, and operation instructions shall be clearly visible at each escape window. The emergency release handle will meet FMVSS-217 requirements and shall not return to the locked position automatically; it shall require the driver or other authorized person to manually re-lock it. An audible alert capable of 95 dBA and a dash warning light shall be produced any time the

- emergency window is unlatched with the ignition on. All emergency exits shall comply with F.A.C. 14-90.
- Each emergency exit shall be identified with window signage, shall provide passengers with a clear identification of exit routes. Next to emergency exits shall be a decal, one (1) inch Helvetica Medium white letters on red background, stating "Emergency Exit"

#### **L. Side and Rear Doors**

- There shall be glass at the top **and bottom** of the rear door (~~no glass at the bottom~~). The rear door shall include emergency exit functionality. The width shall accommodate the egress of disabled persons and meet FMVSS and ADA requirements.
- Rear and side doors shall be easily operable from the inside and need to be locked from the outside with easily accessible door locks provided. (The rear door ajar alarm shall have a light and be audible. All exterior doors to be keyed alike with exception of the chassis. Door and switch key to be interchangeable,

#### **M. Roof Ventilator/Emergency Exit**

- A dual purpose manually opened and electric operated roof ventilator/emergency exit with power fan shall be installed in the raised roof of the vehicle at approximately the center of the passenger compartment. The hatch shall be 23" x 23" minimum and shall be installed so that fresh air can be circulated in the vehicle. A model like Transpec would be acceptable. The hatch shall meet all federal safety standards. No warning devices may be installed.

#### **N. Bumpers**

- OEM front and flat matte black painted formed steel rear bumpers with end caps shall be provided. The rear bumper can bolt to mounting brackets that are welded to the frame rail. The rear bumper may not be closer than 4" to any portion of the end cap at the rear body. Reflective safety tape shall be mounted on the rear bumper so as to provide night visibility for motorists behind the bus. Signs saying: "THIS VEHICLE STOPS AT ALL RAILROAD CROSSINGS". See Section 5 for approved upgrades to Chrome package and Romeo Bumpers. **Approval of bumpers to wrap slightly around ILO rear end camps. The bumper will not have any sharp edges. Bumper will be bolted to the frame.**
- Front bumper shall be OEM chrome and flat matte black painted formed steel rear bumpers with end caps shall be provided.

#### **O. Exterior Body Lighting**

- Exterior body lighting shall meet all state and federal regulations. Where applicable LED lighting will be provided.
- Lighting requirements for the front entry and lift door areas must meet ADA requirements.

#### **P. Exterior Mirrors**

- Dual view ~~manual~~ **heated, and power** controlled exterior mirrors shall be provided and installed with minimum dimensions of 7" x 9" to include a 6" x 4" convex lower mirror. Power mirrors and Euro Style as an option and should be listed in Section 5.
- Heated motorized remote outside right and left side view mirrors shall be provided. Mirrors shall be approx. 15" x 8" in size and constructed of anodized aluminum, chrome plated or other non-corrosive materials. Bottom of mirror, approximately 3", shall be convex mirror. Lucerix, Rosco mirrors or approved equal shall be provided.
- A minimum 8" x 10" wide-angle rear window lens for backing up and driving safety shall be provided.

#### **Q. Finishing Procedures**

- All bare metal components shall be prepped with Ditzler Metal Prep 79 painted with Ditzler DAS 1980 primer sealer and finished with Ditzler acrylic enamel paint to match the vehicle, or equivalent. All welded areas should have particular attention. If another type and method is used, explain in detail on attached sheet. **Accept and approve the standard aluminum exterior skin uses a Valspar Polyester painted applied after the acid wash and rinse pre-treatment. The paint must match the chassis OEM Color. Other exterior metal components, such as the trim around doors and windows, are painted or powder-coated with industry appropriate coating controlled by the manufacturer of the component.**

#### **R. Undercoating**

- The entire underside of the vehicle body, including the undersides of fenders, shall be coated with a fire-resistant asphalt base rubber base, or equivalent.

#### **S. Exterior Color**

- All OEM standard white paint colors shall be available.

2. Any metal body extensions shall match bus body OEM standard paint colors.
3. The body shall match the chassis OEM standard paint color, unless specifically requested by the project that the roof be white with a contrasting body color.

## **T. Interior**

1. Interior finish shall be completed in a highly professional manner. Interior colors shall be color-coordinated and complimentary to the bus's exterior color. All standard interior design options and color palettes should be included in offerors package. Color photos should be included.
2. All sharp edges, sharp corners, and/or protrusions shall be eliminated for safety reasons. Any fastenings or other objects that can catch a passenger's clothing or cause injury shall not be permitted. No abrasions, marks, or cuts will be acceptable on any of the interior walls or seats. An inside mirror (minimum of 7" x 10" 6" x 9") shall be mounted for the driver to see the passengers.
3. Vehicles shall meet all applicable requirements of (ADA) as set forth in CFR 37 and 38, issued September 6, 1991, with respect to the vehicle interior. STOP request pull cord w/ touch tape. Audible signal required. Also, an interior overhead illuminated STOP request sign is required.
4. Interior paneling shall be OEM or equivalent. If interior finish is not OEM bid bidder must provide pictures to show that interior finish is completed in a highly professional manner. Interior color shall be color-keyed to the bus's exterior color. Approve to add carpet ceiling as an option.
5. All rivets, screws, snaps, etc, in paneling shall present a finished look. All joints in the interior paneling shall be covered by trim strips or molding.
6. All interior panels, materials, and treatments shall meet all federal motor vehicle safety standards. A smoke colored plexi-glass modesty-panel shall be located behind the driver.

## **U. Insulation**

1. The vehicle body shall be fully insulated in the roof and all body panels, including all extended top and bottom door panels to deaden sound and reduce vibrations and heat transfers
2. A minimum 2" thick blanket of fiberglass or other equivalent fire-resistant insulation material or OEM insulation package shall be provided in sidewalls

## **V. Flooring**

1. All Floor covering including steps shall be flat design from rear engine hood, rear of driver, to rear of bus without wheel wells. The sub-flooring shall be a minimum 5/8" thick exterior A-C marine grade or equal, waterproof plywood securely fastened to the under structure. All edges, cutouts, notches, etc., shall be properly sealed after cutting to prevent moisture from entering between the plies.
2. 2.7mm thick or greater excluding backing material (thickness of vinyl only). Flooring shall contain aluminum trioxide and silicon carbide for superior slip resistance and quartz rock to prevent wear, blended throughout a high-quality vinyl wear layer. Manufacturer is required to provide batch-testing results upon request on each production run of the flooring product used on this procurement to ensure compliance to the specification. This includes providing written documentation that a PTV pendulum test-rating equal to or greater than 36 is achieved. Flooring shall be an easy to clean, smooth safety floor providing a non-skid walking surface that retains consistent slip resistance, regardless of wet or dry weather conditions, for the life of the bus. All installations and transitions shall be smooth and fully supported from main floor and including to any wall positions, presenting no tripping hazards and minimizing debris accumulation. All seams shall be heat welded to prevent moisture migrating to the subfloor per manufacturer's specifications. Flooring shall have a standee line minimum of 2.5 in. wide and extend across the bus aisle behind the driver compartment. All stair edging shall be marked with a bright yellow or white contrasting strip a minimum of 2.5 in wide. Flooring shall carry a 15 year non prorated warranty.
3. Floor covering shall be slip resistant vinyl flooring, constructed with aluminum oxide, silicon carbide, quartz and multiple colored PVC chip blended throughout a high-quality vinyl wear surface for better depth perception for sight impaired (top coating is not acceptable). Bacteriostats will be incorporated providing all exposed surfaces with excellent anti-bacterial properties. Minimum floor thickness of ~~2.2~~ 2.7 millimeters (combination of flooring and backing material will not be accepted) or approved equal will be acceptable.
4. Seams are to be heat welded to provide a permanent waterproof seal against water penetration leading to premature sub-floor failure or curling leading to possible tripping hazards.
5. Metal molding shall be provided at the edge of the stepwell or threshold and along the front edge of center aisle. Seams are to be heat welded to provide a permanent waterproof seal against water penetration leading to premature sub-floor failure or curling leading to possible tripping hazards.

## **W. Seating**

1. Freedman's or equivalent Driver's seat shall be deluxe high back, fully padded, contoured bucket type of heavy-duty construction, with armrest. The driver's seat shall be easily adjusted forward and backward

- without the use of tools. OEM unbelt restraint system is required. Upholstery shall be color-keyed to the passenger seats. **Approval Accepted for OME Driver seat as long as there is an option to upgrade.**
2. Double bench seating shall be 5 3-34" forward facing RH, 5 3-34" forward facing LH 3-step fixed Feather Weight-Mid-Hi with grab rails and 1-forward facing fold-up bench at rear. (Bidder to furnish floor plan drawing.)
  3. Upholstery material shall be 36 oz. /sq. yd. Minimum, transit vinyl, ALL passenger seats shall be treated with a moisture barrier treatment. Seats shall key to the vehicle's interior panels and exterior color. **Accept approve that vinyl seating is acceptable for moisture barrier, when upgrading seats to cloth seat must be treated with a moisture barrier.**
  4. Knee room 11" – 12"
  5. Aisle width 12" - 14"
  6. Foam padding shall be high density (4.5 pcf) non-deformable foam. Load bearing values in excess of 45ILD. **The State has accepted PCF 3.1-3.2 and the load bearing values ranges from 32-65ILD.**
  7. All seating shall meet or exceed all applicable FMVSS requirements.

## X. Passenger Restraint System

1. Each seat position shall be equipped with 2 3-pt under seat retractable (~~USR~~) restraint belts with push button release and heavy-duty under seat retractors must meet all applicable FMVSS regulations. Length of each belt needs to be sufficient to accommodate a very large adult. Minimum of two (2) seat belt extenders to be included. Seat belt and extenders must be provided by the same manufacturer and work together in unison.
2. Seat belts shall be securely attached to structural members of the seat at two points. Attachment to vehicle under flooring is acceptable when a 3" washer is used. Belts may be attached to and become an integral part of the bench seat if the seat has been tested to meet applicable FMVSS requirements. 207 test.

## Y. Floor Plans

1. Passenger seats shall be arranged such that the unobstructed hip-to-knee room, measured at seat level for each seated passenger, shall not be less than 27".

## Z. Lighting

1. The interior of the vehicle shall be adequately illuminated. All lighting should be LED. Overhead lighting fixtures and courtesy lights shall be arranged in such a manner to provide lighting intensity at a reading level.
2. Adequate light shall be provided for the instrument panel, with intensity controlled by an instrument panel switch.
3. All door lights and the front passenger door/stepwell shall illuminate automatically when doors are opened. Stepwell light type and location shall be provided so as to not be a hazard to boarding passengers.
4. Lift lighting shall be provided and required to illuminate on the lift, as well as on the street surface outside the lift door, to meet ADA requirements.
5. Instrument Panel, Dash, and other Controls
6. Dash shall be color coordinated with interior trim color **combination of gray and black.** ~~Black will not be an acceptable color.~~ Glove box with light and lock to be provided above driver's seat. An engraved or etched **or screen printed on a plastic panel,** plate will be installed in site view of the driver's position stating the overall height clearance.
7. Instrument panel and dash shall be equipped with the following OEM instruments, gauges, and controls. All controls and switches dash shall be within easy reach of the driver. No overhead switches or controls are permitted. Lights in lieu of gauges are not acceptable except as noted.
8. Speedometer with odometer and trip odometer Oil pressure gauge
9. Ammeter
10. Engine coolant temperature gauge Fuel gauge
11. Upper beam head lamp indicator (light) Directional signals (light)
12. Parking brake on (light) Headlight switch
13. Inside hood release
14. Controls for heater, defroster, and air conditioner 12 volt power source
15. Standard OEM AM/FM push button radio, with digital clock or equal Windshield wiper and washer two speed, intermittent type Emergency flashers. **After market radio is acceptable as long as the warranty of the vehicle is not altered.**
16. OEM driver's sun visor and interior rear-view mirror to be provided.
17. Operator instrument panel and console shall be equipped with the following controls. All controls and switches shall be within easy reach of the driver. Need switches with indicator lights, all switches and controls shall be lit.
  - a. General Interior Lights Brake Lock/Lift Over-ride Ventilator Fan
  - b. A/C Rear Entrance Door Rear Heater Lift Door Ajar

- c. Rear Door Ajar w/ Light and Audible

#### **AA. Heating and Cooling**

1. Front heater and defroster shall be OEM with the maximum BTU rating available.
2. Front, high capacity, air-conditioning shall be provided. OEM in-dash unit shall be supplied with the maximum BTU rating available. The dash unit shall be separately controlled from any auxiliary system.
3. An auxiliary rear heater system with minimum of 35,000 BTU's available shall be supplied. The heater shall provide a maximum amount of comfort for vehicle passengers. The unit shall be located in the rear under seat. Blower shall be controlled by a three position and OFF positions.
4. Ceiling mounted rear A/C evaporator, dual split compressor system, shall be ~~Carrier or~~ equal 75,000 BTU **High Performance**; however, the auxiliary floor heater shall remain the same as specified for the rear in 3.10.3. OEM front dash installed evaporator shall be provided. **The A/C air conditioning system shall lower the internal temperature of the vehicle from 100 degrees Fahrenheit to 70 degrees Fahrenheit in 30 minutes.**
5. Air circulation shall be high volume with low velocity to provide draft-free comfort.
6. There shall be a easily accessible shut-off valve(s) in the heater piping located near the engine and easily accessible to permit the water circulation to the heater to be shut off during hot weather.

#### **BB. Stanchion and Grab Bars**

1. Stanchions and grab bars shall be of stainless steel or equivalent, a minimum of 1-1/4" in diameter and **option for** padded. **If P padding** shall be permanently bonded to stanchions and grab bars. All stanchions shall be mounted, structural main members.
2. Vertical stanchion bars shall be provided for both sides of the front passenger entrance. A grab bar shall extend from the left stanchion, rear edge of the stepwell, to the vehicle sidewall at an appropriate height to provide passengers some support while climbing the steps. Padded modesty panels shall be provided at the rear edge of the stepwell, under the grab bar and directly behind the driver seat.
3. Permanently bonded anti-vandal grab bars shall be located on top of each forward-facing permanent passenger seat.
4. A passenger assist grab bar shall be provided on the passenger door area.
5. Additional padded stanchions shall be installed at the locations indicated on attached diagrams.

#### **CC. Priority Seating Sign**

1. Each vehicle shall contain a sign which indicates that the seats in the front of the vehicle are priority seats for people with disabilities.
2. Each wheelchair station location shall be designated as such.
3. The signs shall be in compliance with CFR 38, subpart 38.27 and the Appendix to it.

#### **DD. Emergency and Safety Equipment**

1. Fire extinguisher dry chemical type, multipurpose, Class ABC, 5lb, rechargeable with gauge, UL approved, shall be provided. To be mounted securely in the best area to ensure easy access in the case of an emergency.
2. First Aid Kit – 16 unit (1-15 persons) Ever Ready. First Aid Kit or equivalent shall be provided, seat belt cutter, body fluid, and blood pathogen kit.
3. Warning kit – Three (3) portable warning reflectors, which can be mounted on stands, shall be furnished in a kit or box. Kit shall be mounted in an accessible location.

#### **EE. Wheelchair Lift System**

1. Vehicles shall meet or exceed all applicable requirements of the ADA as set forth in CRF 37 and 38, issued September 6, 1991 or any subsequent updates, with respect to mobility aid accessibility. The contractor is solely responsible for any additions, deletions, omissions, or interpretations of ADA, as it relates to the construction of said contracted vehicle(s).

#### **FF. Wheelchair Stations**

1. Wheelchair stations are the spaces inside the vehicle for transporting persons in wheelchairs and are to be provided on all vehicles having wheelchair lifts. Each wheelchair station shall consist of usable floor area in which a passenger in a wheelchair may be positioned and where wheelchair occupant restraint systems and wheelchair securement devices are to be installed.
2. All wheelchair stations shall be designed to secure wheelchairs in a forward-facing position.
3. Each wheelchair station shall provide adequate room for a standard size wheelchair. No obstructions shall hinder a wheelchair from being rolled into place. Each wheelchair station shall have a clear floor area of 30" in width and 48" in depth. Not more than 6" of required clear floor space may be accommodated for footrests under another seat provided there is a minimum of 9" from the floor to the lowest part of the seat overhanging

the space.

4. ~~Floor plans are attached to indicate types of wheelchair lifts and station locations.~~ **Vendor will include their floor plans with their bids.**

## **GG. Wheelchair Securement System**

1. A four-point track/belt tie down system shall be provided at each wheelchair station to securely hold the wheelchair in a forward-facing position. Securement systems and their attachments to the vehicles, shall withstand a force in a forward longitudinal direction of 2,500 lbs. per securement leg and a minimum of 5,000 lbs. Movement of an occupied wheelchair or mobility aid shall be no more than 2" in any direction. The lap and shoulder belt needs to be retractable.
2. This system shall be composed of the following components, four separate belts, lengths of track with all necessary buckles, hardware fittings, and other parts to make it a complete ADA wheelchair securement system. Q-Straint slide and click and lock or equivalent Floor Track system shall be standard. **Approval and acceptance of SureLock "L" Track if an only if the equal works with the Q-Straint System.**
3. In certain wheelchair station arrangements; shared floor track may be used, provided that adequate belt securement slots are furnished. Adequate length of track should be provided to accommodate various sizes of wheelchairs within each wheelchair station.
4. The recessed track shall be securely mounted into the rubber flooring. Care shall be taken to avoid damaging or destroying the integrity of the rubber flooring. **Approval for an option for the L-Track with slide and click.**
5. During installation of the wheelchair securement system, care shall be taken to avoid damage to any of the vehicle's components. Particular attention should be taken to avoid damage to the fuel tank(s) during and after installation of the floor tracks. One method, which has been used to avoid damage, is to remove the fuel tank(s) from the vehicle prior to drilling of the track bolt holes to prevent puncturing of the tank(s).
6. After bolting the tracks to the floor, any excess bolt length should be cut off. Then the tanks can be remounted with consideration given to using wooden spacers, treated to resist rotting between the underside of the floor and the top of the tank(s). The purpose for the spacers is to block the tank away from the floor to prevent the bolt ends and nuts from rubbing holes into the fuel tank. If removed, the fuel tank(s) should be reinstalled securely and safely.
7. It should be noted that the method of installing the track is the sole responsibility of the vendor and they may use whatever method will obtain the required results. By submitting and signing this bid, the bidder hereby certifies that the wheelchair securement system has met all applicable federal motor vehicle safety standards and has been mounted in accordance with the manufacturer's specifications.
8. When not being used for securement, the securement system shall not interfere with passenger movement, shall not present any hazardous condition, and shall be reasonably protected from vandalism. Track size shall be the appropriate length so that all belts of the system can be attached. Location for mounting the track may be on sidewall or behind modesty panel; however, the location must be easily accessible.
9. Literature describing and giving instructions on the use of the wheelchair securement system shall be provided with each wheelchair lift equipped bus. One hour of wheelchair securement training given by a certified ADA trainer shall be given at the time of vehicle delivery.

## **HH. Wheelchair Occupant Restraint System**

1. A three-point restraint system consisting of a lap and shoulder belt combination shall be provided for each wheelchair station. The shoulder belt shall be a minimum of 86" in length and the lap belt shall be a minimum of 43" in length. Belt connection around wheelchair occupant shall be button release and comply with all federal and state motor vehicle safety standards and regulations. **Approval and acceptance of the lap belt to secure to the retractor assembly and not the floor tracks.**
2. The shoulder attachment point shall be secured in a structural member of the sidewall. The lap belt shall be secured by inserting in into the floor track provided for the wheelchair securement system. The shoulder and lap belt shall connect at the buckle portion of the restraint. Restraints shall be designed and installed in such a manner that the restraint belts transfer crash forces to the hips and upper torso portions of the skeleton and shall not transfer these forces to the abdomen section of the passenger. The attachment shall comply with all federal and state motor vehicle safety standards and regulations.
3. Shoulder belts shall be retractable at the wall connection or removable and shall not hand loose or interfere with movement in bus when not in use. Restraint belts that are removable from floor and wall shall be stored in same track or other storage area as provided for in wheelchair securement system. Restraint belts permanently fixed to the floor will not be acceptable.
4. The wheelchair occupant restraint system shall be independent from the wheelchair securement system. Restraint system shall not be attached to the wheelchair.

## **II. Wheelchair Lift**



1. The wheelchair lift system shall be a system which permits persons confined to a wheelchair to enter and leave a vehicle while in a wheelchair, without difficulty, by means of a vertical lifting platform or lift and which also provides for the safe transportation of persons in wheelchairs inside the vehicle. Acceptable basic wheelchair lift bid shall be either Braun 1000 Lbs. lift models. Bidder shall submit manufacturer's specification for approval with bid.
2. Wheelchair lift shall be of electro-hydraulic or electro-mechanical powered designed.
3. Lift shall require an independent power source. The lift shall operate on the vehicle's existing heavy-duty electrical system as specified in 1.3.6. The lift shall have separate wiring and the lift interlock switch shall be mounted on the hinge side of the lift door.
4. The frame and platform design shall have been tested to a static load of 2400 lbs. The lift shall have 1100 lb. tested lift capacity and a 1000 lb. continuous lifting capacity.
5. The design for lift mechanical load bearing components shall have a safety factor of at least 6; all other structural parts shall have a safety factor of 3. The design factor shall be defined as the ratio of the failure load to the design load.
6. The lift's self-destruct characteristics shall be tested by cycling it two times without a load and with limit switches inoperative. At each position where limit switches normally prevent the lift from continuing (for example, at the uppermost position) power shall be maintained to the lift for five seconds after the platform comes to rest. The lift shall be designed to withstand such action without damage.
7. All hardware that will be subjected to wear, corrosion, or other adverse action that would reduce the safety of the lift, and items requiring periodic maintenance shall be provided with easy inspection access.
8. Placement of the lift or the method of attachment shall not significantly diminish the structural integrity of the vehicle or cause a hazardous unbalancing of the vehicle either by its weight when the vehicle is moving or by its weight and load when the vehicle is stopped, subject to the vehicle manufacturer's recommendations.
9. All fasteners for joining parts or attaching the lift to the vehicle shall be specified by the lift manufacturer and be able to withstand operating vehicle and lift vibrations without loosening.
10. Shear areas or pinching action mechanisms of the lift shall not be readily accessible to occupants, passengers, or operators during normal operation of the lift. In the event that readily accessible shear areas of pinching actions mechanisms are unavoidable, the safety of occupants, passengers, and operators shall be provided for by physical barriers, safety-stop switches restricting the operating force of the equipment below that which cause injury or other recognized safety methods.
11. All exposed edges or other hazardous protrusions on the lifts which are stowed inside the passenger compartment shall be equipped with padding of a thickness to the manufacturer's recommendation. Padding shall be of an energy absorption material capable of minimizing injury-producing forces and shall extend to within 3" of the vehicle floor.
12. All protrusions or moving parts of the lift mechanism which could snag clothing shall have a guard or shield to protect passengers and/or operator.
13. Interior padding shall be provided above the door opening for the lift to avoid injury during loading and unloading of passengers. Padding shall extend the entire width above the door opening and shall also be provided along the interior roof-ceiling mating edge, and at all other locations where sharp or potentially hazardous edges occur.
14. All through-body fittings shall be of non-corrosive materials.
15. All wiring and cords for an interior mounted lift shall be able to withstand adverse weather conditions, extreme heat, and cold. Protective covering for wiring and cords shall be provided, if necessary.
16. Vendor shall re-undercoat with an automotive type undercoating, and otherwise seal all through-body fittings from moisture. The reapplication of undercoating is only required for through-body fittings
17. An operational manual shall be provided with each vehicle to include at a minimum, normal and manual lift operations, and preventive maintenance schedule, use of wheelchair restraint and seat belt system, lift trouble shooting and parts listing. One hour of lift operation and safety training shall be provided at the time of delivery with each vehicle. . If the training is not possible at the time of vehicle delivery, the training must be schedule on a later date. Evidence of such training must accompany other documents such as invoice etc.

## **JJ. Lift Platform**

1. Platform surface shall be a slip resistant material and shall be free of any protrusions over ¼" high that might cause injury to operator and passengers. The platform construction shall be of expanded metal mesh, to allow for driver vision through any portion that overlaps a window when in a stored position.
2. The platform shall have a minimum clear width of 32", a minimum clear width of 34" measured from 2" above the platform surface of 36" above the platform, and a minimum clear length of 54" measured from 2" above the surface of the platform to 36" above the surface of the platform.
3. A transition or bridge plate shall be hinged design and mounted as an integral part of the bus so as to provide a smooth transfer from the platform to the interior of the vehicle. The transition plate shall be mounted in

such a manner that the sides of the plate do not make contact with inside rails of the platform. The transition plate shall be secured so as not to interfere with the operation or storage of the lift platform or the placement of wheelchairs.

4. When the platform is at vehicle floor height, gaps between the platform edge and the vehicle floor shall not exceed  $\frac{1}{4}$ ".
5. Platforms shall be equipped with a movable barrier or inherent design feature shall prevent a wheelchair from rolling off the edge closest to the vehicle until the platform is in its fully raised position.
6. Platforms shall be equipped with permanent vertical side plates at least 2" higher than the surface of the platform.
7. An automatically actuated roll-off barrier across the full length of the loading-edge or entrance ramp of the platform shall be provided this spring-loaded barrier will be in the fully up position before the platform leave the ground. Lift will not operate if inboard barrier is not locked and in full upright position. The barrier shall be of sufficient height when closed to prevent a power wheelchair from riding over the barrier. The entrance ramp shall not exceed a slope of 1:8, measured on level ground, for a maximum rise of 3", and the transition from ground to ramp may be vertical without edge treatment up to  $\frac{1}{4}$ ". Thresholds between  $\frac{1}{4}$ " and  $\frac{1}{2}$ " high shall be leveled with a slope no more than 1:2.
8. The basic bid shall be on an automatic interior lift that provides a self-locking, rattle free mechanism to secure the lift when stowed.
9. Platforms shall be capable of being raised and lowered with no sudden acceleration, deceleration, or jerking motion. The lift shall be equipped with a mechanism to allow manual adjustment of the platform's descent and ascent speed.
10. The platform shall not move at a rate exceeding 6 inches/second during lowering and lifting an occupant and shall not exceed 12 inches/second during deploying or stowing.
11. Platforms, when in the raised horizontal position, shall not deflect more than 3 degrees in any direction between its unloaded position and when loaded with 1200 lbs applied through a 26" x 26" test pallet.
12. The platform shall be capable of lowering a minimum of 1.5" below the reference ground line, enabling it to be used in a condition where the ground level is lower than the vehicle standing level.
13. Handrails shall be provided on two sides of the platform and move in tandem with the lift. Handrails shall be graspable and provide support. Handrails shall have a usable component at least 8" long with the lowest portion a minimum 30" above the platform and the highest portion a maximum 38" above the platform. The handrails shall be capable of withstanding a force of 100 lbs. concentrated at any point on the handrail without permanent deformation of the rail. The handrail shall have a cross-sectional diameter of 1-1/4" to 1-1/2" or shall provide an equivalent grasping surface. Handrails shall not interfere with wheelchairs entering or leaving the vehicles. Handrails in the stowed position shall not extend in the vehicle's passenger area more than 5" and shall be secured in such a manner to keep them from rattling and prevent them from becoming a hazard to passengers. All lift platforms must include a safety interlocking restraint belt that enables lift operations when engaged as standard equipment.

## **KK. Lift Controls**

1. Operating controls shall be of heavy-duty commercial type and shall be designed for hand- held operation with adequate cord extension to allow operation of the lift by the operator standing outside the vehicle at a position behind or at the side of the lift platform. A method for storing and securing the controls when not in use shall be provided. All lift configurations are required to mount and fastened excess lift control cord securely to the lift and lift door.
2. The controls shall be designed to be use safely without adverse effects to the operator or to the controls in all weather conditions.
3. Lift controls shall be easily understood by the operator and shall not allow automatic sequencing of the lift from one mode to another that would jeopardize the safety of the wheelchair passenger.
4. Operation switches shall require continuous force from the operator for functioning.
5. Lift controls shall allow for instant direction reversal at any point in the cycle.
6. In addition to the normal operating power, a manual backup system for unloading wheelchair passengers and returning the lift to the stowed position shall be provided in the event of electrical failure. The backup system shall be mounted on the interior of the vehicle and in a location that will not interfere with passenger loading and unloading.
7. Lift platforms stowed, or when occupied shall have provisions to prevent it from deploying, falling or folding any faster than 12 inches/second or it from dropping of an occupant in the event of a single failure of any load carrying component.
8. The lift controls shall be inoperative unless the vehicle's emergency brake is activated. For models that require exterior mounting of the lift controls, a power cut-off or interrupt switch shall be installed on the dash panel to prevent unauthorized use of lift controls while vehicle is parked and locked. The power cut-off shall also prevent a battery drain.

## **LL. Lift Door**

1. Lift door opening shall meet all ADA requirements.
2. The lift door opening shall be a minimum of 43" x 68". Trim panels can be screwed, but all other components shall be of welded construction.
3. Door shall be equipped with a device to prevent doors from closing when the lift is in motion. If single door is provided, a T-Latch is required.
4. Door(s) shall be securely attached and shall not leak. Door shall include an upper fixed glass window.
5. A light shall be installed inside and above the lift door. The light shall operate automatically when the lift door is opened and provided at least 2-foot-candles of illumination measured on the entrance area and the lift platform.
6. The same light in 4.8.6 or other lights mounted outside the lift door shall provide at least 1- foot- candle of illumination on the street surface for a distance of 3 feet from all points on the lift platform. Such light shall be located below door level and shielded to protect the eyes of entering and exiting passengers.

## **MM. Additional Requirements**

1. In addition of these specifications, lifts and all related equipment shall be designed, built attached and operated in accordance with all applicable safety codes and design standards. Examples of some to the applicable codes and standards are:
  - a. Society of Automotive Engineers (electrical components and wiring, hydraulic components, fasteners)
  - b. American National Standards Institute (chain drive and wire rope components);
  - c. American Welding Society (welding code and recommended practices);
  - d. Federal Motor Vehicle Safety Standards, etc.

## **NN. Miscellaneous Requirements**

1. Driver Warning - The engraved vehicle height clearance warning sign shall be posted in clear view of the driver. (ref:3.9.1)
2. The equipment provided, and work performed under this contract will be financed, in part, by grants provided under programs of the Federal Transit Act, as amended. All federal requirements shall apply to this contract.

## **OO. Options**

1. Optional equipment items not included in this specification are listed in the attached spreadsheet for each vehicle class. The "Optional Equipment Additions" should NOT be included in the base price of the vehicle. Any "Optional Equipment Deduction" should be included in the base price of the vehicle.
2. Using Governmental Units will adjust their purchase orders by adding any "Optional Equipment Addition" to or deducting any "Optional Equipment Deduction" from the base price of the vehicle.
3. Using Governmental Units may wish to add optional equipment not listed in the attached spreadsheet. Pricing for said items will be at dealer cost plus no more than 10% markup. See section VIIB "Optional Items" for more details.
4. The state wishes to obtain pricing for the Angle Trax brand of "In Vehicle Recording Systems". The Angle Trax brand is intended to be an add on camera system to existing Angel Trax recording systems when those systems are already in use by the Using Governmental Unit. **Standard number of the cameras depends on the size of the vehicle. Standard is (3) three cameras interior and (3) three cameras exterior.**

## **PP. Basic Provisions**

1. WARRANTY REQUIREMENTS: Warranties in this document are in addition to any statutory remedies or warranties imposed on Contractor. A description of the local dealer warranty process shall be included in the Purchasing Agreement package including information on how warranty issues are tracked. The Contractor warrants and guarantees to each end user that each complete vehicle, and specific subsystems and components as follows
2. COMPLETE VEHICLE The vehicle is warranted and guaranteed to be free from defects for a minimum of Thirty-six (36) months or thirty-six thousand (36,000) miles, whichever comes first, beginning on the date of acceptance of each vehicle. During this warranty period, the vehicle shall maintain its structural and functional integrity. The warranty is based on regular operation of the vehicle under the operating conditions prevailing in the purchaser's locale.:
3. SUBSYSTEMS AND COMPONENTS Specific subsystems and components are warranted and guaranteed to be free from defects and related defects for the times and/or mileages provided by the OEM.

## **QQ. Delivery**

1. Dealer shall be responsible for delivering vehicles that are properly serviced, clean and in first class operating

condition. Pre-delivery service, at a minimum, shall include the following:

- a. Correct and repair all deficiencies noted in the SCDOT vehicle inspection report conducted on each individual vehicle at the purchasing agency location.
- b. Check all fluid levels to insure proper fill levels.
- c. Ensure engine is in proper operating condition.
- d. Inflate tires to proper pressure.
- e. Check to insure proper operation of all components, accessories, gauges, lights, and mechanical and hydraulic features.
- f. Cleaning of vehicle, and removal of all unnecessary stickers, markings and debris.