TROLLEY SPECIFICATIONS

Approximate Dimensions

Length overall – excluding cowcatcher ..... 20' to 24'
Body Width – excluding mirrors ..... 93" to 96"
Height Overall ..... approx 118"
Interior Headroom – over aisle ..... no less than 98"
Gross Vehicle Weight Rating ..... 14,200 lbs.
Wheelbases ..... approx 178"
First Step Height ..... 10" to 12"
Drop Floor Entrance Height …… …… 7"
Floor Height ..... 15.5" max.
Aisle Width ..... 22" min.
Clear Door Opening ..... 30" min.
Passenger Capacities …… 20-24

1. Structure

1.1. Chassis

1.1.1 The trolley floor/chassis shall constructed of mild carbon steel 2" x 3" box tube structure designed as a uni-body of the floor/chassis completely electric arc welding to create a cage like structure that is integrated with the side walls and roof. Out rigger supports shall be positioned in a grid pattern and placed strategically to provide strength and support to the overall structure preventing warping of the finished floor. The entire structure shall be welded from the floor/chassis to the walls and roof to provide strength, rigidity, and integrity to carry the ultimate loads and withstand road shock and vibration fatigue. The floor structure shall be sealed and sheeted with minimum 26 gauge galvanized sheeting providing a vapor barrier, using a marine plywood sub flooring material that shall be waterproof and non-hygroscopic and resistant to mold growth as the base floor and attached to the framing using TEK screws. Each seam is then filled with filler and sanded smooth before installing the transit flooring.

1.2. Front, Rear and Side Walls

1.2.1. All wall sections shall be constructed of a combination of 1 1/2 inch 16 gauge mild steel box tubing and a combination of 1 ½" mild carbon steel tubing, electrically arc welded together in a specialized framing jig. The lower half of the wall construction

shall be a load bearing monocoque design to support the chassis load. Side, front and end fitting members shall be carried to the roofline and constructed to adequately carry the design loads and absorb impact and stress. This application creating a cage like structure that provides strength and durability preventing movement at all joints and stress points. The wall sections shall be sealed with Sika Flex 221 at all joints and seams. The entire structure shall be washed with Prep Sol 330 and primed with an epoxy primer, then sheeted with aluminum bonded composite sheeting using Sika Flex 552, then riveted with stainless steel Magna-Lok fasteners to the framing where necessary throughout each panel.

1.2.2. The exterior shall not have decorative wood applied.

1.3. Roof

1.3.1. The roof structure shall be made of 1 1/2 inch 16 gauge mild steel box tubing electrically arc welded together to the wall members to prevent drumming or vibrations. The roof shall have a lantern style cupola to maintain the vintage theme of 1800 era streetcars. The top of the roof framing shall be sealed with Sika Flex 221, covered with .125 aluminum sheeting. All seams shall be welded to create a one-piece aluminum roof structure. Cupola windows shall be approximately 1/8 inch safety tempered glass. The front and rear shall have a 6-inch minimum overhang and the sides a 3 -inch minimum overhang covering the entire vehicle. The roof shall have a drip rail rain gutter running the entire perimeter of the roof.

1.4. Wheel Housing and Step Wells

1.4.1. The wheel housing and step wells shall be fabricated of 12-gauge galvanealed steel and welded to the floor structure. The wheel housing and step wells shall create and be sound deadened and sealed with a rubberized asphalt undercoating to eliminate sound passage to the interior of the vehicle.

1.4.2. There shall be wheel covers on all wheel openings painted and trimmed to match the body design

2. Paint, Insulation and Undercoating

2.1. Paint

2.1.1. The framing shall be washed with a metal prep wax and grease remover, and then primed with PPG DPHS 52 low VOC primer. All exterior panels shall be prepped with DX440, primed with an etching primer PPG 1652, a base primer of PPG DPHS52 low VOC primer, specially designed anti-corrosion resistance. The primer shall be allowed proper drying time and sanded prior to applying the standard two tone PPG Concept Acrylic Urethane Colors and clear coat. A Standard Vintage pin-striping

package shall be installed. Paint scheme shall be red on bottom and green on the upper portion of the vehicle to match existing CVTD vehicles

2.2. Insulation and Undercoating

2.2.1. The walls and roof shall be insulated with a minimum 1 1/2 inch dow bead board insulation in walls and roof. The engine compartment shall be properly sealed to prevent heat, noise, and fumes from entering the interior of the vehicle and insulated with a fire and heatproof sand barrier, foil faced Insultech sheeting or similar. No interior body surface temperatures shall exceed 100 degrees Fahrenheit. The entire understructure shall be undercoated, to a minimum 1/8 inch thickness with rubberized asphalt based, emulsion type undercoating to provide complete protection from oxidation due to outside elements. All Metal surfaces shall be washed and primed with a zinc chromate PPG primer prior to assembly. All underside sections below the floor line shall be re-sealed after assembly and coated with a minimum 1/8 inch thick rubberized asphalt based emulsion type undercoating.

2.2.2. All fasteners shall be stainless steel. Trim pieces and fixtures installed shall be treated with an anti electrolysis corrosion preventive material.

3. Bumpers

3.1. Bumpers

3.1.1. Front and rear bumpers shall be one-piece, steel fabricated assemblies. The front and rear bumpers shall be approximately 4 inches in height and designed to follow the contour angles of the front and rear caps. The placement of the bumpers shall be arranged to provide protection against body damage at standard SAE heights. The bumpers shall be PPG painted with a minimum 3 mil PPG Poly with a Rhino liner covering to prevent chipping. There shall be tow hooks mounted to the underside of front and rear bumpers.

3.1.2. The front bumper shall have a vintage cow- catcher made of heavy woven wire and steel construction.

4. Doors

4.1. Access Doors

4.1.1. Access doors shall be provided where necessary to service engine, radiator, air conditioning components, batteries, fuel fill, fluids, electrical panels, and all other components or accessories requiring service.

4.2. Entrance/Exit Door

4.2.1. An electric operated, outward opening style entrance/exit doorway shall be provided on the curb (right) side, front and rear each with a clear minimum opening of 38 inches. Edges on the doors shall have extruded rubber, sensitive edge that overlaps to provide a sealed doorway and safety edge. The doors are operated by an overhead, electric rotary powered, door actuator. A momentary switch controls the doors, which is located to the left of the driver and outside under the passenger side headlamp bucket. The doors are designed to open or close in approximately 1.5 to 3.0 seconds. The front entrance shall incorporate an ramp which meets or exceeds ADA standards.

4.3. Emergency Exit Door

4.3.1. There shall be an emergency roof hatch located in the rear of the trolley. Front and rear entrance doors shall have emergency pull pins for egress.

5. Mirrors

5.1. Exterior Mirrors

5.1.1. The vehicle shall be equipped with two (2) dual head exterior mirrors, one on each front corner. The mirrors shall be manually adjusted California Style. The top section of the two exterior mirrors, are a flat mirror while the bottom is a convex mirror. The mirrors are firmly attached to the vehicle in which precludes vibration at normal speeds, and located so as to reflect to the operator a view of the highway to the rear along both sides of the vehicle. The mirrors shall be finished in flat black polyurethane enamel paint.

5.2. Interior Mirror

5.2.1. A 7inch x 16inch rear view mirror shall be located above and in front of the driver's area, for view of the interior of the vehicle. The mirror shall be mounted with a swivel point and shall be adjustable.

6. Mud Flaps, Fender Flares and Rub Rails

6.1. Wheel wells

6.1.1. Reserved

6.2. Mud flaps

6.2.1. Shall be installed behind all wheels and extended within 3 inches of the road surface to prevent flying debris.

6.3. Rub rails

6.3.1. Reserved

7. Windows

7.1. Windows and windshields are designed to allow maximum serviceability with minimum maintenance and shall be in accordance with FMVSS571.205.

7.2. Windshield

7.2.1. There shall be three windshields to keep the authentic vintage trolley design along with side and rear windows that are arched at the top.

7.3. Passenger Windows

7.3.1. The passenger windows have a vertical slider with a center glass drop sash design - with a 2 point latch system easily operable by the passengers.

7.3.2. The windows shall have an etching design to add to the vintage appearance (etching to be pre-approved by CVTD).

7.4. Emergency Exit Windows

7.4.1. There are a sufficient number of emergency exit windows located on driver side, passenger side, and rear of the coach to meet FMVSS 217 for emergency exits.

7.5. Driver Side Window

7.5.1. The driver's area shall have one clear T-slider arched windows for easy access.

7.6. Glazing and ratings are as follows:

7.6.1. Windshields: 1/4 inch safety glass AS-1 rating no tinting

7.6.2. Driver's windows: 1/8 inch tempered safety glass AS-2 rating no tinting

7.6.3. Passenger windows: 1/8 inch tempered safety glass AS-3 rating 25 percent tint

7.6.4. Cupola windows: 1/8 inch tempered safety glass AS-3 rating 25 percent tint

7.6.5. Entry Door Windows: 1/8 inch tempered safety glass AS-2 rating no tint

8. Windshield Wipers

8.1. Each windshield wiper has a separate, heavy duty, intermittent electrically powered windshield wiper motor located below the windshield. Windshield wiper blades are of sufficient length to clean the windshield surface. Electrically operated windshield washers, with a one-gallon reservoir provided for the windshields and shall be conveniently located for easy filling. The wiper motor shall be easily changed by an ASE certified mechanic within 20 minutes.

9. Engine Compartment

9.1. The engine compartment shall be fully insulated with a foil faced fire retardant barrier material. There shall be a firewall of 11 gauge steel between engine compartment and passenger compartment. There shall be sufficient lighting for servicing in the engine compartment.

10. Interior Finish

10.1. Floor

10.1.1. Sub Floor

10.1.1.1. The floor shall be made of ¾" 7 ply marine plywood sub flooring and shall be waterproof and non-hygroscopic and resistant to mold growth. The sub floor shall be attached to the floor framing with counter-sunk TEK screws. All joints and seams shall be sealed and sanded smooth.

10.1.2. Floor Covering

10.1.2.1. Floor covering shall be Altro non slip transit flooring or approved alternate. The floor covering shall be glued to the plywood sub floor and shall be laid smooth without any gaps or bubbles. There shall be a white standee line located near the drivers platform to keep riders back and shall include a sign informing riders to stand behind the white line. The driver's platform area shall be covered with Barymat 5/8" thick sound deadening acoustic black matting or approved alternate.

10.2. Walls and Trim

10.2.1. All interior walls are covered with a 1/4 inch red oak paneling and trimmed with solid red oak handmade pieces. The roof and cupola are also covered with 1/4 inch red oak paneling and trimmed with handmade solid oak trim pieces. All oak panels and solid oak trim shall be sanded and finished with 3-5 coats of high gloss two part clear polyurethane. All edges of flooring along wall sections are sealed with a color matching rubberized silicone sealer. Marine varnish is used on any exterior wood exposed to outside elements using a minimum of 5 coats. There shall be oak rails for advertising signs between the wall and the cupola roof area with an 11" spacing between parallel rails.

10.3. Step Treads

10.3.1. The step assemblies shall be covered with Altro transit non slip flooring with metal backed white or yellow edge nosing.

11. Heating

11.1. Driver Heater/Defroster

11.1.1. The heater/defroster shall be manually controlled to provide the optimum of comfort to the driver in any type of weather. The driver's area shall be heated and ventilated by a separate forced air heater system. Driver's area heat shall be a minimum 22,000

BTU's. The windshield defroster airflow shall be through diffusers mounted on the dash panel below the windows and shall provide 52,000 BTU's.

11.2. Passenger Heaters

11.2.1. The passenger area heaters shall consist of one unit located beneath the seats to evenly distribute the heated air throughout the passenger compartment with a total of 45,000 BTU's. Switches located in the driver's compartment shall control all heating units. Combined with the defrost system the heating shall be a total of 119,000 BTU's

12. Air Conditioning

12.1. The air conditioning unit shall be of R134A freon type with a minimum cooling capacity of 120,000 BTU's capable of maintaining a temperature inside the vehicle of not more than 72 degrees on a 100-degree outside temperature with 80 percent relative humidity. All Freon lines shall be of barrier type hose that shall be rated for Freon 134A use and mounted permanently to the vehicle. The evaporator system shall be mounted in the rear of the trolley interior passenger area. The evaporator shall have an easily accessible cleanable filter. The ducting shall be covered and trimmed in red oak to match the interior finish. One (1) TM21 compressors shall be installed in the engine area. The condenser is a rear skirt mounted on the driver side. There shall be a separate air conditioning unit located in the driver's area for driver's comfort.

12.1.1 Roof mounted Air Conditioning system placed in the center of the vehicle with vents blowing forward and backward.

13. Stanchions, Guard Rails and Grab Rails

13.1. Entry Grab Rail

13.1.1. There shall be a vertical stanchion, guardrail and modesty panel immediately to the left of the entry door. All railing shall be 1 1/4 inches to 1 1/2 inches OD by .050 inch smooth stainless steel tubing. The guardrail shall be horizontally affixed to the stanchion and the wall of the vehicle at least 27 inches above the floor.

13.2. Overhead Grab Rails

13.2.1. Overhead grab rails shall be installed on each side of the trolley, running the entire length of the vehicle affixed to the cupola roof edge. These shall be mounted and securely fastened to the roof. The driver's barrier shall cover the area behind the driver with a modesty panel railing and Lexan shield or approved alternate. The entry shall have a grab rail located on each side of the step well. All required grab rails shall be located according to ADA regulations.

13.2.2. Leather Grab straps shall be available as optional upgraded equipment.

14.3 Seat Back Railings

14.3.1 There shall be stainless steel horizontal hand railings on the seat backs for passenger assist in all seating locations throughout the trolley.

14. Modesty Panels

14.1. Decorative modesty panels fabricated from steel and painted to coordinate with the color of the vehicle, and trimmed in oak shall be installed at the front of the seats located at the entry/exit area. The same modesty panels shall be located at the proper positions in the wheel chair assist areas.

15. Sound System

15.1. There shall be a standard sound system consisting of AM/FM radio/CD combination with 8 passenger area speakers and one driver's speaker location in the driver's area.

16. PA System

16.1. A gooseneck microphone shall be attached to the overhead compartment, above and to the left of the driver and be capable of adjustment to the driver's left shoulder neck area. An output jack shall be provided in the operator's area for future installation of a handheld microphone. A foot mounted switch shall be supplied to afford hands-free operation of the PA system. The PA system shall also incorporate selected inside/outside/both operation of internal and external speakers.

17. Passenger Signal System

17.1. There shall be a passenger signal system using a dual chime indicating the general passenger area stop requested and the ADA area stop requested. The passenger area shall have cording at each seat with a leather pull strap. The ADA area shall have a touch tape conveniently located to each restraint position. When the stop requested is activated a lighted stop request sign is illuminated and will remain until the doors are opened for passenger exit.

18. Lighting

18.1. Exterior Lighting

18.1.1. All exterior lighting shall be 12V DC LED circuits in accordance with FMVSS 571.108 and shall be LED where possible.

18.2. Front of trolley:

18.2.1. (2)-Headlight assemblies shall be single high/low beam round sealed beam halogen lights and shall have a beauty ring of brass or chrome to match exterior of vehicle.

18.2.2. (2)-Amber turn signals shall be provided in the front section of the trolley, as turn, and flasher.

18.2.3. (3)-Amber identification shall be centered on the top of windshield front of the trolley

18.2.4. (2)-Amber identification lights shall be placed on each outer corner of the top front, to match 18.2.3.

18.2.5. A vintage style center headlight shall be installed in the center front of the trolley finished in either brass or chrome to match the vintage look of the vehicle.

18.3. Rear of trolley:

18.3.1. (3)-Red identification lights shall be centered on the top rear section of the trolley visible to rear traffic.

18.3.2. (2)- Red Identification lights shall be placed on the top outer corner of the rear of the trolley.

18.3.3. (2)-Clear reverse lights shall be placed in the lower section of the rear of the trolley.

18.3.4. (2)-Red stoplights shall be placed in the lower section of the rear of the trolley.

18.3.5. (2)-Red taillights shall be placed in the lower section of the rear of the trolley.

18.3.6. (2)-Turn signal lights shall be placed in the lower section of the rear of the trolley.

18.3.7. (1)-License plate light shall be placed in the lower section of the rear of the trolley above the license plate.

18.4. Sides of the trolley:

18.4.1. (4)-Amber lights shall be placed on the sides of the trolley, (2) one each side of the top front corner, (2) one at each side of the lower front corner.

18.4.2. (4)-Red lights shall be placed on the sides of the trolley, (2) one each side of the lower rear corner, (2) one each side of the top rear corner.

18.4.3. (2)-Amber middle turn signals shall be placed on the lower middle section on each side of the trolley.

19. Safety

19.1. Hazard lights shall be installed on the trolley bus with an actuating switch adjacent to drivers position.

19.2. (2)-Step well LED lights shall be installed at each entry/exit doorway.

19.3. (1)- Flood type LED light shall be installed in the wheel chair door area.

20. Interior Lighting

20.1. Passenger Area Lighting

20.1.1. All interior lighting shall meet FMVSS requirements. There shall be a minimum six (6) interior white, shatterproof, 8” dome style fixtures throughout the roof area of the

vehicle. The bases shall be chrome finish. Separate switches shall operate the rear and front section of the passenger area.

20.2. Entry/.Exit Area

20.2.1. At the entry/exit there shall be an overhead courtesy light that will come on when the door is opened and remain on until the door is closed again. Each step well area shall have (2) step well lights with top covers to shield from glaring light, and one overhead light. The step well lights will automatically come on when the door is opened and remain on until the door is closed.

20.3. Driver's Area

20.3.1. Over the driver's area there shall be a separately controlled light for the driver's convenience. There shall be a separate switch controlling the driver's light.

21. Driver's Seat

21.1.1. A Bostrom driver's seat shall be air suspension, provided with full adjustment functions.

22. Passenger Seating

22.1.1. Passenger seating in the trolley shall be authentic vintage tram design of oak slats and cast aluminum scrolled seat ends paint to match the color scheme of the trolley. All seats shall be 34 inches in width and shall have smooth urethane coated finish of a minimum of 3-5 coats. Seating arrangement shall be forward facing, perimeter or a combination.

22.1.2. **Seat Cushions** shall be included made of flame retardant materials in durable vinyl materials of matching color scheme with 2" foam bottom. Seat cushions shall be constructed/manufactured to attach to wood slatted seats.

23. Driver's Console

23.1. Dash and Instrument Panel

23.1.1. The driver's console shall be designed for the safety of the operations as well as the comfort of the driver. The forward dash console shall have a complete complement of instrumentation and controls consisting of:

- speedometer with an odometer
- voltmeter
- engine temperature gauge with warning lights
- water temperature

- oil pressure gauge
- fuel level gauge
- parking brake
- high-beam indicator
- directional signal indicator
- headlight beam switch
- radio AM/FM CD

23.1.2. To the left of the driver shall be all other vehicle accessory switches including:

- a master on/off switch
- A 12V- 2 speed driver's fan shall be mounted in the header area with a driver's control switch located in the switch panel.
- A sun Visor shall be mounted in the header area over the drivers front windshield

23.2. Horn and Trolley Bell

23.2.1. A 12V horn shall be located at the front of the vehicle and protected from wheel splash.

23.3. Trolley Bell

23.3.1. An electric bell shall be mounted on the top front of the vehicle for the driver to ring manually by a pull cord located to the left of the driver's seat.

24. Electrical Wiring and Panel

24.1. Electrical System Description

24.1.1. All wiring shall meet FMVSS. The electrical system shall be 12V, using micro relays to allow driver's console switches to operate at lower amperage.

24.1.2. A wiring diagram shall be submitted that will match the wiring for each vehicle.

24.1.3. All switches and wiring circuits shall be protected with circuit breakers.

24.1.4. All circuit breakers shall be labeled for identification and installed in the sealed weather proof, lockable, electrical panel on the exterior of the driver's side.

24.1.5. All circuits shall have LED diagnostics for ease during troubleshooting.

24.1.6. All switches shall be of heavy-duty transit design. All wiring shall meet SAE standard requirements.

24.1.7. All wiring shall be automotive stranded and shall be color-coded and labeled. All wiring shall be installed using quick disconnect harness junctions using weather-proof Packard pin connectors.

24.1.8. There shall be no more than 10 wires per harness and include 2 extra wires per harness for accessories.

24.1.9. All harnesses shall be secured at a maximum of 8" to 10" intervals.

24.1.10. Any wiring through wheel well area shall be protected by routing through metal convoluted tubing and flex loom.

24.1.11. All connectors are insulated; shrink-wrapped and soldered where necessary.

24.1.12. All wiring shall be protected by circuit breakers and a 200 ANL fast acting fuse shall be installed for added protection.

24.1.13. There shall be (2) 110 volt outlets located under the roof edge with an inverter located in the drivers header compartment. This system shall be used for decorative lighting.

25. Batteries

25.1. Description

25.1.1. There shall be (2) Deka 1100 cca batteries.

25.1.2. These batteries shall be located in a stainless steel rollout battery tray. The battery connections shall be of sealed anticorrosion coating. An ANL fuse shall be installed for protection of all circuits.

25.2. Battery Disconnect

25.2.1. There shall be a transit style master disconnect installed in the battery compartment for safety and maintenance.

26. American's with Disabilities Act (ADA) Equipment-Optional Equipment

26.1. Wheel Chair Lift

26.1.1. A ramp shall be provided in the front entrance of the trolley. A full ADA approved interlock system shall be installed.

26.1.2. The ADA ramp shall be installed to insure minimum ramp slope to street level.

26.1.3. The four way hazard warning lights shall be automatically activated when the ramp master switch is in the enabled or on position at the operator's console.

26.2. Wheel Chair Securements and Flip Seats

26.2.1. The wheel chair tie downs shall be Q Straint retractable floor mounted restraint system or approved equal to accommodate two wheel chair positions. There shall be a storage box located under the flip seat area for the restraint equipment.

26.2.2. There shall be a 2 passenger flip seat positioned parallel to the wall in each wheel chair area for use when not transporting a wheel chair seated passenger.

26.2.3. Priority seating signs will be provided at each wheelchair location. Characters on these signs shall be in accordance with ADA regulations and/or provisions.

27. Safety Equipment

27.1.1. Drive shaft guards shall be installed between every pair of universal joints.

27.1.2. A 10-pound type B.C. fire extinguisher shall be supplied.

27.1.3. A triangle flare kit.

27.1.4. A body fluid clean up combination first aid kit

27.1.5. A transit style battery master disconnect shall be installed.

27.1.6. An audible back-up alarm shall be installed.

27.1.7. All doors and wheel chair ramp/lift shall be interlocked through the shift inhibitor, parking brake, and/or braking system.

27.1.8. Entrance doors shall be equipped with a sensitive edging to prevent closing when obstructed.

27.1.9. All appropriate warning labels shall be installed.

27.1.10. A single back up camera shall be located in the rear of the trolley for backing up with a black and white monitor located on the drivers dash area.

27.1.11. A Safety Vision SVR-4100 four (4) Camera system shall be installed with a DVR player for recordings. Camera positions are to be pre-approved by CVTD

29. Power Train

29.1. Engine

29.1.1 The engine shall be a 6.0 liter V-8 gasoline SFI Flex fuel, 324 hp at 4700 rpm with 373 lb-ft torque rear wheel drive engine. An optional V-8 turbo diesel engine shall be listed as an option.

29.2. Exhaust System

29.2.1 The exhaust system shall be a stainless steel or aluminized stainless steel exhaust system. Complete units must meet United States noise level and exhaust emissions requirements. Exhaust must extend rearward of the rear axle and exit from under the vehicle either from the rear or roadside of vehicle.

29.3 Fuel System

29.3.1 There shall be a 50 gallon fuel tank installed on the vehicle. The tank will have internal baffles to prevent surging. The tank is to be located behind the rear axle with the fuel fill on the roadside of the vehicle.

29.4 Charging System

29.4.1 The Alternator shall be a 220 amp minimum at driving speed and 175 at idle. Design shall include a built-in integral type voltage regulator with integrated solid state circuitry.

29.4.2 A minimum of two 770 cca heavy duty batteries shall be furnished. Each battery shall be 12 volt rated. Batteries shall be frame grounded. Batteries shall have a side mounted threaded type posts. A “transit” style mater disconnect shall be installed in the battery compartment.

29.4.3 The starter shall be a 12 volt rated electric type.

29.5 Transmission

29.5.1 The transmission shall be heavy duty automatic electronically controlled 6-speed. The transmission shall have override and tow/haul mode with internal transmission oil cooler. Transmission shall be engineered/manufactured to be compatible with the rear wheel drive engine requested.

29.6 Engine Wiring and Circuits

29.6.1 All wiring furnished in the engine compartment area shall be automotive and number coded, meet FMVSS and be of SAE GXL insulated type cross linked Polyethylene fire retardant construction. All wiring furnished shall be routed in protective harnesses. When harnesses go through metal structure, rubber grommets shall be used to further protect the integrity of the harnesses.

29.6.2 Engine Circuits with the exception of the starter and instrument cluster feed circuits, shall be Circuit Breaker protected except where safety requires otherwise.

30. Axle and Suspension

30.1 Front Axle

30.1.1 A heavy duty front axle and suspension shall have a load capacity of 4300 pounds.

30.2 Front Suspension

30.2.1 The front suspension system shall be front independent with coil springs and stabilizer bar to emphasize maximum ride comfort. The suspension system shall be rated at 4300 pounds and include two (2) tuned fully adjustable shock absorbers.

30.3 Rear Axle

30.3.1 The rear axle shall be hypoid drive axle and have a load capacity of 8600 pounds, with 4.10/3.73 ratio gas/diesel.

30.4. Rear Suspension

30.4.1 The rear suspension shall be equipped with multi leaf springs adjustable sway bar and fully adjustable coil over shock absorbers.

31. Tires and Wheels

31.1 Tire and Wheels

31.1.1 Tires shall be Michelin 225/75R 16 E All season steel belted radial. Seven (7) tires shall be provided which will include one (1) spare tire shipped loose.

31.1.2 The wheels shall be standard 16.0 x 6.5, 8-lug steel wheels. Seven (7) wheels with dual rear shall be supplied included the spare shipped loose. Wheels shall be painted to coordinate with the body paint scheme.

32. Brake System

32.1 Disc Brakes

32.1.1 The front brakes shall be dual piston 2.20” diameter cylindrical, pin slider caliper size 13.03” outside diameter. The rear brakes shall be self adjusting size 12.90” diameter. Anti-lock four wheel system.

32.2 Parking Brake

32.2 Transmission mounted drum, foot operated, push to apply/push and release to disengage.

33. Steering System

33.1 Steering System

33.1.1 The steering wheel diameter shall be no less than 18” and no more than 20” The rim diameter shall be 7/8” to 1 ¼” and shaped for firm grip with comfort for long periods of time.

33.1.2 The steering wheel shall be removable with a standard or universal puller. Steering wheel spokes and wheel thickness should be such as to insure that visibility is within the range of a 95 percentile range as described in SAE standards. Placement of steering column must be as far forward as possible, but either inline or behind the instrument cluster.

33.1.3 The steering wheel shall have a rearward title adjustment range of no less than 40 degrees as measured from the horizontal and upright position.

33.1.4 The steering system shall be variable assist, power.

34. Jacking

34.1 Jacking

34.1.1 It shall be possible to safely jack up the bus, at curb weight, with a common 10 ton floor jack with or without special adapter, when a tire or dual set is completely flat and the bus is on a level hard surface, without crawling under any portion of the trolley. Jacking from a single point shall permit raising the bus sufficiently high to remove and reinstall a wheel and tire assembly. Jacking pads located on the axle or suspension near the wheels shall permit easy and safe jacking with the flat tire or dual set on a 6-inch high run up block not wider than a singe tire. Jacking a changing any one tire shall e completed by a 2M mechanic helper in less than 30 minutes from the time the bus is approached. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

34.1.2 Jacking pads shall be painted safety yellow for ease of identification.

35. Destination Signs

35.1.1 There shall be a front LED destination sign with software and programming card.

36. Farebox

36.1 Farebox shall be installed adjacent to entrance ramp within arm’s reach and visible to the driver

37. Optional Equipment

37.1 Optional equipment available shall be listed on a separate sheet to include pricing