NYCT August 2, 2021 RFI, Fully Electric 6 Passenger Paratransit Bus

DESCRIPTION: It is the intent of this specification to describe and request information on a heavy-duty body on DRW (dual rear wheel), wheelchair accessible, Commercial/Paratransit type fully electric bus. The bus shall conform to all ADA, FMVSS, and NYSDOT requirements in effect at time of manufacture. The bus shall be powered by a fully electric powerplant, as determined by NYCT. The chassis GVWR (Gross Vehicle Weight Rating) and wheelbase shall be determined by battery payload while maintaining 6 passenger capacity, 100-mile range with 8-10 operating hours on a single charge. The finished vehicle must not exceed manufacturer's weight limit when loaded to passenger capacity including driver. Chassis provided for build will be a fully electric 2022 model year or newer. New York City Transit will approve the chassis that is to be used based upon our service operating requirements and mileage/operating hour ranges of chassis being offered as options.

The contractor shall be responsible to furnish and deliver a complete and serviceable vehicle able to withstand service in New York City, notwithstanding any errors or omissions in this specification.

NYCT reserves the right to inspect and examine a contractor's vehicle of similar design and construction as to the one being described in this vehicle spec.

QUALIFICATION WITH PILOT VEHICLE:

If you have not previously received a contract for Paratransit buses prior, a vehicle contractor must first comply with the following within 5 days RFI is submitted for consideration.

1) All CAD drawings, documentation, calculations, finite element analyses are to be submitted for review and a pilot vehicle provided that is constructed using the correct Ford E-Transit DRW (dual rear wheel) chassis option requested. The pilot bus must be a wheelchair accessible vehicle configured as described in these vehicle specs.

The following documentation and third-party certifications shall be submitted with RFI in accordance with requirements of these specs:

- CAD Drawings of entire body structure including attachment of body structure to OEM cab.
- FEA (Finite Element Analysis) of entire structure demonstrating floor structure using, High-Strength Low-Alloy Steel and main body structure constructed of not less than 18-gauge steel (30,000 PSI yield strength) withstanding the loading forces expected in the New York City operating environment. Test shall be based on poor road conditions with 4" inch potholes 36" wide at a speed of 15 mph.
- Altoona Test Results with noise level report.

QUALIFICATION WITH PILOT VEHICLE:

- Compliance to vehicle manufacturer's standards for construction of bus body on a chassis is required.
- Reports on weight distribution, stress analysis, load charts etc.
- FMVSS 214 Side Impact Protection Test as described in vehicle specs.
- FMVSS 210 Floor Pull Test for seating configuration described in specs.

2) The pilot bus will be subjected to testing by independent engineers retained by vehicle contractor for Fitness-For-Service (FFS) testing based on typical annual Paratransit service requirements of mileage, routes and trips performed. Shaker table and road testing within the 5 boroughs of NYC will be performed on pilot vehicle using 60-70 strain gages installed on the following locations and other areas of the vehicle based on review conducted in Task 1.

- Left & right A-pillars
- Body to chassis mount areas fore & aft of axles
- WC door header areas
- Longitudinal chassis attachment to transverse members
- Engine mount locations
- Longitudinal-to-transverse chassis frame connections
- Shock mounts
- Roof structure and attachment to OEM Cab.

3) Two triaxial accelerometers sets will be installed: (1) within the seating section of the bus and (2) on or near the primary suspension.

4) Road testing will be performed for 3 days over routes and under driving conditions provided by MTA NYCT. Data will be acquired at typical vehicle sampling rates and checked for suitability during the course of testing.

5) All data will be evaluated to determine maximum strain/stress levels. Moreover, the road test data will be evaluated using rain flow counting techniques and proprietary algorithms to establish the vehicle's FFS and fatigue life at each strain gage location.

6) A comprehensive presentation will be prepared and shared with NYCT following completion of the data analyses.

Following the presentation, a detailed final report will be submitted. The report will contain all test results, analyses, conclusions, and recommendations. Once contractor's pilot bus satisfies FFS testing requirements the contractor will qualify to bid on this vehicle procurement. Final FFS testing report and all documentation submitted for qualification will be confidential and proprietary.

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QUALIFICATION WITH PILOT VEHICLE:

NYCT will only accept bids without FFS Testing under the following circumstances:

- A vehicle contractor previously sold us vehicles that successfully operated in Paratransit service without any structural failures and complies with these vehicle specs or

- A vehicle contractor that submitted FFS testing results on recent prior contract award and has their vehicle in Paratransit service with no structural failures at the time their bid is being considered for this contract award.

Qualification with Pilot Vehicle would not be required under both these circumstances.

GENERAL: The following are the acceptable ranges of dimensions for the paratransit bus. Bidders shall submit their proposed vehicle dimensions for approval by NYCT.

OVERALL LENGTH	20' – 22'
EXTERIOR WIDTH	80"
WHEELBASE-	DRW with optional wheelbase to support battery payload and desired vehicle range.
OVERALL HEIGHT	108.5" – 116.25"
INSIDE HEIGHT	76" – 80.5"
STEP HEIGHT	10" – 11.5"
CLEAR FRONT PASSENGER ENTRY DOOR OPENING	Minimum 30"
CLEAR FRONT PASSENGER ENTRY DOOR HEIGHT	77" – 80"

BIDDERS PROFFERING BUSES OUTSIDE OF THE ABOVE ACCEPTABLE RANGES OF DIMENSIONS SHALL NOT BE CONSIDERED FOR AWARD.

POWER PLANT: The powerplant shall be a fully electric motor shall powered by rechargeable on-board electric batteries. All non-OEM related equipment must be approved by NYCT.

ROAD SPEED GOVERNOR: A road speed governor shall be supplied that is field programmable, "Plug & Play" installation, micro-processor-controlled system that limits maximum vehicle speed. The system shall be an InterMotive Speed Sentinel II (e.g., SS501) or approved equal. It is preferred that OEM electronic vehicle controls be used to govern vehicle speed if this option is available.

FIRE SUPPRESSION:

The vehicle shall be equipped with AMEREX ABC 3 spectrum rated AVT agent (Elec., fossil fuel & wood, leaves / trash etc.) fire suppression system rated at –65° F to 150° F by Factory Mutual Research Corporation. The automatic actuation system shall provide 24-hour fire detection of the vehicle's batteries, electric motor and electrical systems under heavy operating load.

The system shall include the following features:

• A minimum 25 capacity agent cylinder of the stored pressure type shall be furnished and be constructed of welded steel and must conform to DOT specification 4BW and be rated for 12-year minimum hydrostatic retest. The cylinder shall be outfitted with a gauge and a forged brass valve assembly.

• Two (2) temperature sensitive weatherproof miniature thermostats, constructed of stainless-steel material and rated at 350° F, shall be located in the motor compartment. A third (3rd) miniature thermostat shall be located in the vehicle battery compartment. Detectors shall be approved for use by Factory Mutual Research Corporation (FM) as heat actuated fire detectors.

The detectors shall be normally open and shall be capable of carrying sufficient amperage for the purposes of firing the electric actuator. The electric control head shall also be activated manually by depressing an electric switch (button w/pull pin, labeled 'fire') mounted in the driver's dash area.

FIRE SUPPRESSION:

• A Control Panel shall be provided to electrically supervise the automatic fire suppression system following wiring circuits:

POWER, HEAT DETECTION and SYSTEM ACTUATION. The monitor shall provide a display indicating, NORMAL, FIRE or FAULT conditions.

• A Built in Battery Back-up feature is required with a minimum of 24-hour full monitoring capabilities, in the event of vehicle battery depletion.

• Two (2) brass nozzles shall be located in the engine compartment, fitted with dust caps that upon actuation are displaced to allow full ABC chemical flow. A third (3rd) brass nozzle will be aimed at the transmission and a fourth (4th) brass nozzle shall be located in the vehicle battery compartment.

• The bus OEM (contractor) shall provide a written sign off (from the fire suppression manufacturer) that all installation requirements have been met on the pilot bus system.

• An inspection door will be provided by the OEM on the bus body allowing for visual site inspection of the agent cylinder gauge.

TRANSMISSION: Vehicle shall include automatic back-up alarm and a Intermotive Gateway HL HiLock (GTWY201-HL) heavy duty progressive warning interlock, allowing lift operation only when the transmission is in “park” and, conversely, the transmission shall not be capable of being shifted out of “park” when the wheelchair lift is energized.

CHASSIS: The chassis frame shall be fabricated from high strength steel alloy formed and welded into a rigid perimeter frame with formed and fabricated crossmembers. Wheelbase shall include dual rear wheels. Heavy-duty integral hydraulic power steering with tilt wheel, without cruise control, shall be provided.

BRAKES: The service brakes shall be fully power assisted, four-wheel disc type. Full ABS is required. **The system shall conform to applicable FMVSS testing and shall conform to NYS DOT regulations at the time of delivery.**

TIRES: The bus shall be furnished with five, (5) LT245/75RX16 Hankook Dynapro all season treads, steel belted radial tires. Any other brand tire and tire spec must be approved. Delivery shall include matching full-size spare tire mounted on rim, shipped loose inside of vehicle. All wheels shall be powder coated white.

ELECTRICAL: Batteries furnished for electric vehicle application must be of the latest Nickel-Ion or Lithium -Ion battery technology furnished by OEM. Batteries must be capable of powering the vehicle for 8-10 hours of operation before recharging is required. The weight of the vehicle's batteries shall not exceed the vehicle's GVWR (Gross Vehicle Weight Rating) and maintain the seating capacity of the vehicle. All optional battery packages with vehicle ranges must be submitted to NYCT for evaluation. **Contractor must submit to NYCT the battery manufacturer's rated life cycle of the battery with replacement cost.**

Batteries mounted under the frame shall be encased in an accessible battery box with sliding non-corrosive battery tray. The tray must provide positive securement of the batteries and easy maintenance access. All chassis batteries shall be isolated from the body circuits by means of a heavy-duty master battery cut-off switch located within the battery box. The steal case must provide wheel splash protection. A skirt position is acceptable.

The bottom of the battery-box must be at the same height as the bottom edge of the skirt panels, to prevent damage to the box. Where heavy duty/rough service switches are optional, they are to be provided.

All wiring shall conform to the current applicable standards of the Society of Automotive Engineers and be of sufficient size to carry the required current without excessive voltage drop. The Wire Shall Have Adequate mechanical strength for the application and be of a sufficient gauge size to carry the current without overheating.

ELECTRICAL:

All wiring and related devices shall be installed in a quality workmanship manner and be mechanically and electrically secure.

1. All wiring shall be color-coded; function coded or permanently and continuously numbered for ease of identification and must be continuously loomed. All wiring shall be adequately protected from water, solvents, road splash, stones, grease, oil, fuel, abrasion and chafing.

2. Shields shall protect all wiring and cables not installed by the engine manufacturer, which are subject to extreme heat, where necessary to prevent fires and premature failure.

3. All parts of the wiring system shall be adequately protected from corrosion.

4. Battery cables shall be heavy-duty and adequate to carry current output of the electrical system.

5. Grounding wires shall not pass through hinged doors or any other cover.

6. All harness and wiring shall terminate at appropriate junction terminals set in Bakelite or molded plastic material.

7. Entire system shall be of "plug and play" design. All electrical connectors shall be machine crimped. All interior electrical connections shall be Metri-Pack series automotive grade with TPA (terminal position assurance). No butt connectors or butt splices shall be used. All wiring under the vehicle or exposed to outside elements shall be Weather Pack. Manual reset circuit breakers or circuit breakers that reset with the recycling of the power source shall protect all body circuits. All circuit breakers shall be clearly identified and easily accessible from inside each vehicle. Fuses, where utilized, shall be placed in a single block. The fuse block shall contain holders for spare fuses of each type.

8. Devices such as lamps and wiring requiring periodic checking and servicing shall be readily and easily accessible and serviceable. All exterior devices shall be sealed to prevent entrance of water.

ELECTRICAL:

9. There shall not be exposed or loose wiring in the driver or passenger compartment of each vehicle.

10. Any wiring installed, as an after-market installation that is subject to vibration or other movement must be encased in continuous metallic tubing or be of the armored "BX" type. This requirement is necessary only when wiring is passed through or within body or chassis member. All wiring shall be easily accessible for repair. The main harness shall not be installed in body panels but shall be mounted inside wiring channel located inside the bus. All switches shall be heavy-duty marine grade 20 amps. Or greater, with one plug connectors.

11. Wiring, harnesses, and raceways shall be supported at regular intervals by "P" clamps or by other supporting hangers where necessary and routed in separate hangers from heater hoses or air conditioning hoses.

CHARGING EQUIPMENT:

All the electric vehicles must be furnished with the OEM manufacture's Level II charging station for each vehicle in the test program. The testing period for electric vehicles will be for a period of 6-8 months. Chargers must be capable of delivering a full charge to the vehicle in 6-8 hours.

Contractor's must prepare a proposal to equip seven (7) Paratransit carrier locations in the 5 boroughs of New York City with multiple charging stations. Each carrier location shall be equipped with fast chargers to charge 75-100 vehicles at one time. The charging equipment for the seven Paratransit locations will be phased in over a 3-year period and align with Paratransit's electric vehicle procurements. Dates for electric vehicles procurements are TBD (To Be Determined). The outfitting of carrier locations with charging stations is to be coordinated by manufacturer of the electric vehicle, contractor and local utility Consolidated Edison.

REBATES AND INCENTIVE PROGRAMS:

Each proposal submitted by a Contractor must include an itemization of all applicable Manufacturer Rebates and NYSERDA (New York State Energy Research and Development Authority) incentive funding for each vehicle and charging station purchased and installed.

OPTIONAL/STANDARD EQUIPMENT:

Proposals are required for the cost and sustainability for the following optional features:

- Telematics and vehicle health monitoring.
- Real-time-in-vehicle driver coaching with voice assistant.
- Pre-trip cabin preconditioning.

GPS/AVLM:

All vehicles delivered to NYCT must be pre-wired and equipped with GPS/AVLM equipment contracted from:

Stratagen Systems/DDS Wireless

8271 154th Ave NE
Redmond, WA
Office: +1-425-821-8454
Contract #: W-32564

The installation of this equipment is vehicle specific requiring fabrication and manufacturing of certain parts relative to the vehicle application. Part manufacturing includes but is not limited to mounting brackets and wiring harnesses. Contractor has option of acquiring and manufacturing of parts on their own or purchasing parts from GPS/AVLM contractor (INIT). Wiring schematics, technical information and support can be obtained from GPS/ AVLM contractor. All GPS/AVLM installations shall be approved by NYCT, comply with NYS DOT regulations and be tested prior to delivery. Installation of the GPS/AVLM equipment shall not delay delivery of the vehicles.

See AVLM specs for installation manual, material sourcing and Technical Specifications.

SUSPENSION:

The New York City Transit will be purchasing vehicles equipped with standard factory installed OEM equipment on the rear suspension.

The bus shall feature the highest level of comfort, dampening and stability. Front suspension shall be provided by twin steel coil springs and telescoping double action gas pressurized shock absorbers. Further dampening and enhanced responsiveness shall be provided by a suitably sized chassis mounted anti-roll bar.

Suspension ratings as measured at ground are as described in the following table:

TBD- To be determined

STEERING: Power steering system shall be equipped with an OEM cooler for the power steering fluid.

STRUCTURE: The following are general guidelines and minimum requirements for the main cabin structure.

The coach body shall have a noise level not to exceed a range of 75 to 79 decibels in service with all accessories on (excluding wheelchair lift operation) at normal operating speed. The coach shall maintain this range with a noise level of 80 decibels is introduced to the exterior. Penetration shall not raise the interior noise above the specified level as described in Altoona test description 7.1-II. Altoona Testing Report shall be submitted with bid.

Weight distribution, stress analysis, load charts, etc. shall be submitted with bid.

Testing shall have been performed in accordance with FMVSS requirements and accepted SAE and NHTSA guidelines. All information shall be considered confidential and proprietary.

The main body roll cage structure, with the exception of the floor cross members, shall be fabricated from not less than 18-gauge galvanized steel with a yield strength of 30,000 psi. The structure may consist of Rectangular tubing boxed structural channel or approved alternative shaped stock.

The steel frame structure roof, sidewalls, floor and rear shall be fully welded into a continuous, unitized, three-dimensional roll cage structures. Bus sidewalls must have a distinct and integral crash rail of at least

STRUCTURE:

16 gauge galvannealed steel at least 5 inches wide and formed into a "C" channel with at least 1" flanges shall extend the full length of the sidewalls and across the rear of the bus with the exception of the rear emergency door. Sidewalls of the bus shall not terminate at floor level and must extend below the floor line by at least 3" inches in such way that the floor structure braces the sidewall in the event of a side impact collision.

Uprights and crossmembers shall be located and braced sufficiently to insure absorption and dispersal of shock loads throughout the structure and to prevent local overloading.

The body structural framing shall be suitably treated against corrosion prior to finish panel attachment. Special attention is required to welded areas. All tube structure below the window line shall be protected with DuPont Corlar 25P High Solid Epoxy Mastic, (or approved equal) to protect tube structure from corrosion.

Entire floor structure must be sprayed with self-etching primer or suitable sealer prior to attachment to vehicle frame rails. Bus under body must be completely undercoated upon completion of vehicle.

The exterior body panels shall be constructed of pre-painted 24 gauge, galvanealed sheet steel or .040" aluminum sheet, primed on both sides: all steel floor structure shall be primed before mounting onto the chassis.

All steel doorframes shall be painted before installation, so that there are no unpainted surfaces butting against each other, where corrosion may occur.

Contractor is required to submit a copy of a report documenting a successful FMVSS 214 Side Impact Protection Test performed at a certified test facility of a side impact to a bus by a barrier of at least 3000 pounds moving at a speed of at least 30 mph. Said test must demonstrate that egress windows and doors remained functional and adequate protection to the passengers inside the bus.

Contractor is required to submit a copy of a Finite Element Analysis (FEA). Demonstrating that their entire body structure will withstand the loading forces expected in the New York City operating environment. Test shall be based on poor road conditions with 4" inch potholes 36" wide at a speed of 15 mph. Submission of Altoona test report is not a satisfactory fulfillment of this requirement.

The material used for body construction and method of fabrication shall be subject to approval by the New York City Transit.

OEM CHASSIS PROGRAM:

Participation in OEM QVM (Quality Vehicle Modifier) or equivalent quality program is required. Proof of current annual certification is required.

- **FMVSS 214 Side Impact Test, FEA, QVM Certification, fabricating methods and materials used for construction shall be submitted within 5 days of notification of apparent low bid.**

ROOF: A one-piece insulated roof shall be fully integrated into the main cabin structure. The design and construction shall be such as to afford protection from rollover and resistance to impact.

One-piece roof refers to the construction of the roof structure. The roof structure should consist of one-piece roof bows that extend from sidewall to sidewall. Roof structure is to be covered with no more than 2 sheets of steel or aluminum applied in a manner to ensure a watertight seal. Roof construction and fabrication is subject to approval.

Contractor is required to submit within 5 days of notification of apparent low bid CAD drawings that demonstrate re-enforcement of OEM cab structure and attachment of OEM cab to bus body and roof.

FLOOR: Floor framing for vehicles configured to accommodate 3 wheelchair positions with fold down street side double seat to opt for ambulatory passengers. Seats for 2 ambulatory passengers shall be stationary and integral with the preceding structure and shall be built on a minimum of 11-gauge cross-members, with a maximum spacing of 24” inches.

Floor framing for vehicles configured to accommodate 3 wheelchair positions with fold down street side double seat to opt for ambulatory passengers and 2 ambulatory passenger stationary seating shall also be integral with the preceding structure as well as constructed with a floor

throughout passenger area. Floor framing shall consist of a minimum of 11-gauge, full height solid steel cross member with a maximum spacing of 24” in all areas with the exception of between the wheel wells were a maximum spacing of 30” shall be maintained. Out-riggers, elevated or platform design floors shall not be acceptable. The floor shall terminate in area of the vehicle cab where no transition step is allowable.

All floor structure shall be constructed of High-Strength Low-Alloy Steel with a minimum Yield Strength of 50,000 psi and a Tensile Strength of

FLOOR:

60,000 psi. (US Steel High-Strength Low-Alloy Steel EX-TEN L 50 or equal). All participants in this IFB must submit a vehicle manufacturer's statement of acknowledgement of this critical requirement.

Contractors are required to submit a copy of a Finite Element Analysis (FEA) demonstrating that their proposed floor structure using High-Strength Low-Alloy Steel will withstand the loading forces expected in the New York City operating environment for the 7 year life cycle of the vehicle. FEA is to be submitted within 5 days notification of apparent low bidder.

Test shall be based on poor road conditions with 4" inch potholes 36" wide at a speed of 15 mph. Submission of Altoona test report is not a satisfactory fulfillment of this requirement.

The floor shall be constructed of 3/4-inch Douglas fir veneer plywood. Plywood shall be American Plywood Association "Marine Grade", 7 ply, "A-B" (or better) and shall be so marked. Plywood shall be free of internal voids. Composite flooring material in lieu of plywood material is acceptable provided that composite floor material specs are submitted to NYCT for approval. Floor construction shall be of sufficient strength to support a standing passenger load of 150 pounds per square foot throughout the bus with minimal deflection. Wood shall be treated to prevent hygroscopic absorption of water through any/all surfaces including the edges. All wood to metal interstices shall be caulked prior to assembly to eliminate all voids. Caulking shall remain flexible throughout the service life of the bus.

The floor, as assembled, including the sealer, attachments, and covering, shall be waterproof, non-hygroscopic, resistant to wet and dry rot, resistant to mold growth, and impervious to insects. A galvanized steel or aluminum sub-floor (moisture barrier) shall be installed beneath the plywood floor and shall be suitably sealed and completely undercoated prior to installation, paying particular attention to the rear wheel-wells.

Interior flooring shall be The Altro Transflor heavy-duty designer flooring (Storm # 903). Floor covering shall form a visually seamless floor covering. Floor covering shall extend to include entrance/exit areas as well as steps, except the driver's compartment. The occurrence of seams shall be minimized. Where seams do occur, they shall be heat welded and waterproof. Particular attention is required in the floor area of wheelchair securement.

FLOOR:

Vehicles with raised floor shall have a two-inch wide Altro E-P Bright Yellow band molded into the floor material and shall be provided on the edge of the vestibule floor step rearward of the driver's seat and in-line with the forward modesty panel.

All vehicles shall have a permanent smooth two-inch wide, full width, bright yellow band marking the edge of each step at the passenger entrance. Each tread shall be completely sealed around the edges with waterproof rubber sealant.

WHEELWELLS: Wheel wells shall be fabricated with 11-gauge galvannealed steel, to provide adequate structure to support the seat frame and two seated passengers. In addition, wheel wells shall have a wheel well liner made of durable plastic or other non-corrosive material integrated into the body construction extending at least 4" inches into the rear wheel wells above the tires, to protect the sidewall and outer portion of the wheel well from water and debris thrown up by the tires. Wheel well liners shall not interfere with the OEM chassis axle jounce. Wheel wells simply constructed of galvannealed or other noncorrosive material is not sufficient protection.

GLASS: Windshield shall be OEM standard tint conforming to standards in effect at the time of manufacture. SAE/FMVSS standard automotive tempered safety glass shall be provided at all side windows. Glazing shall provide for minimum 69% exclusion tint; aftermarket membrane coatings are <u>not acceptable</u>. In the interest of durability, ease of maintenance and reduced replacement costs, the window glazing shall be flat sheet.

Window framing to be extruded aluminum sash, top "T"slider or double slider design. Windows shall be mounted into the sidewall in such a way that the window frame structure shall overlap tube structure of the sidewall. Provision shall be made for drainage to prevent incursion of rain or wash water into the bus.

One window on each side shall be suitable for emergency exit per FMVSS. The exact configuration shall vary dependent upon entry door and wheelchair lift but a minimum of 5-6 windows are desired. Single leaf lift door shall have window conforming to sidewall windows. Rear emergency door shall have upper and lower glass and fixed glass windows flanking rear door.

Passenger compartment regular use manual hinged or sliding window panels shall be located at the top of the window frame to avoid passenger

GLASS: safety hazard. Additionally, a transit bus 5-position roof vent/emergency exit hatch shall be provided as well as a rear emergency exit door.

Five positions will be defined as: Closed, forward open, aft opened, full opened and opened for escape.

INSULATION: **A**dequate insulation shall be provided throughout the vehicle to minimize extreme temperature variation and maintain passenger comfort. Insulation material shall be flame retarding and shall not support insect infestation or the formation mold and fungus.

Insulation shall extend throughout the sides, roof and rear of the vehicle. Vibration compacting or settling during the life of the vehicle shall not affect any of the insulation material's properties.

LIGHTING: All interior illumination including step well shall be provided by white L.E.D. lights. Interior illumination shall be provided by 6 cove or flush mounted light fixtures. Step wells shall be lighted by automatic lamps upon door opening. Step well lighting shall be shielded. Emergency exit lights shall be located appropriately to identify exit windows.

Exterior cab lighting shall be OEM. Body lighting shall be to FMVSS, and NYSDOT standards.

All exterior coach lighting, shall be LED: stop, directional, back-up, clearance, auxiliary high-mount brake light, license plate illumination and exterior step well/ lift area illumination (if mounted in skirt). The vehicle shall be equipped with signal lights on both sides of the vehicle mounted 29 inches from ground level to center of light and be visible to motorists on ether side.

To enhance visibility and operational safety, the bus shall be fitted with daytime running lights. Additionally, operation of the wheelchair lift or opening the lift door shall automatically flash 4" diameter amber LED lights installed in the left and right side upper quadrants of the rear of the vehicle (see "Wheelchair Lift").

ADA approved illumination of the lift door and curb area adjacent to the lift and entrance step well shall be provided. This illumination must meet the requirements of FMVSS, NHTSA, and NYSDOT if applicable.

HANDRAILS: Interior handrails, stanchions and uprights shall be provided along both sides of the cabin as well as at the entrance door (see photos).
Dual parallel handrails are required. Entrance grab rails shall be angled parallel to the incline of the front steps and should be approximately 36" high. Handrails shall commence at the first step and continue to the floor

HANDRAILS:

level. Entrance door handrails shall be of 1.25" min. diameter steel tubing with "Dura-Diamond" high visibility yellow textured finish to aid gripping. All of the above shall be identical to previous description, 1.25" min. min. diameter "Dura-Diamond" high visibility yellow textured finished steel tubing. Swaged, lug or flange fittings shall be used to join tubes and for attachment to superstructure.

Crushed ends will not be acceptable for joints. Special attention is required to prevent sharp edges resulting in passenger injuries.

All interior stanchions (entrance, driver and wheelchair lift barrier) shall be constructed of the aforementioned high visibility yellow textured Dura-Diamond stanchion material.

All tubes shall be attached to the main structure in a manner that will distribute loads into the structure and avoid local overloading. Railings and attachments shall be subject to approval.

CLIMATE CONTROL:

OEM dash panel air conditioning/heating shall be provided and augmented by an aftermarket Carrier/ MCC (Mobile Climate Control) EM-7 air conditioning system. The system shall be pressurized by dual underhood belt driven refrigerant compressors.

Secondary thermostatic controlled evaporator with heavy-duty multi-speed electric fan shall cool the main cabin. Condenser and fan shall be mounted at street side skirt panel as necessary to provide heat transfer. System shall be rated at not less than 35,000 BTU.

A hot water (engine coolant) forced air auxiliary tower heater shall be provided in the main cabin. Engine coolant manual shut-off valves (delivery and return) are to be provided in the system. Tower heater shall be rated at not less than 60,000 BTU and is to be installed in the rear of the vehicle (see seating diagram for tower heater location in right rear corner of interior).

All HVAC hoses and wiring shall be protected form chafing at all structure contacts and bends. Suitable clamps are required to support A/C hoses to prevent damage to lines, contributing to premature system failure. Operation and performance of the heating/air conditioning systems shall be subject to approval.

INTERIOR TRIM: The coach ceiling and front bulkhead shall be trimmed and covered in a fabric headliner, the coach interior sidewalls and trim shall be FMVSS approved, form fitted, insulated, ABS, FRP, or approved composite material closely conforming to the superstructure. Trim shall be designed for durability and ease of maintenance as well as a professional appearance.

PAINT/GRAPHICS:

For vendors presenting vehicles constructed with material that require painting the coach body shall be professionally prepared and painted with DuPont Centari or equal acrylic enamel. The coach body paint must match the OEM color of cab. Striping and logos shall be provided and applied by the contractor as directed by New York City Transit. All exterior decals and striping shall be 3M Scotch lite Reflective vinyl graphic film 5100-75P Blue, part# 75347192157 or approved equal. The NYCT Vehicle Number shall be applied to the Driver's Overhead Panel that will allow any passenger to view the vehicle number, additionally; the vehicle number shall be applied to the upper left side rear of the vehicle. Final Vehicle manufacturer's and or supplier's logos, name plaques, decals etc. are forbidden anywhere on the vehicle exterior or interior (with exception of OEM chassis supplier). **See attached photographs detailing required decal locations on vehicle.**

SEATING: All seats & seat belt anchorage shall conform to FMVSS 210. Driver's seat shall be OEM high back bucket with lap/shoulder belts. No auxiliary seat is required, as the area will be part of the entranceway to the main cabin. Forward facing (floor plan dependent – see enclosed floor plans) ambulatory passenger seating shall be the Freedman high back pillow cushion seat with vertical stitching for added comfort with approved retractable lap belts (or equal). The lap belts must be similar to those in our present fleet, allowing passengers that require belt extenders to fit the buckle of the new fleet. All seat belt equipment must be approved by NYCT.

Lap belts on the aisle side will have an under-seat retractor mechanism (seat top belt retractor mechanism is not acceptable) and a vandal proof metal seat belt loop to prevent strap falling to the floor (an elastic loop is not acceptable). Structure shall be based on welded stainless steel or e-coated tubing with separate double padded base ("pillow seats"). Seat covering shall be heavy-duty transit grade vinyl. Seat color OXE-4563 dark oxen blue or approved equal. The width of all seat bases shall be 17.5" minimum. Black corner padded grab handles shall be incorporated into aisle side seat backs. Seating shall be mounted-to the main structure by means of floor tracks or seats shall be mounted to the wall and floor in

SEATING:

a way that acts as a buttress to the wall structure. Seat attachment by simply bolting through the floor is not acceptable. Seat shall have dual pedestal support one at the inner and one at the outer edge to provide maximum legroom. Each side shall have an armrest, which can be raised or lowered to allow entry and comfort at aisles. Stationary seating shall be provided for 2 ambulatory passengers and 3 wheelchair passengers along with 1-fold down street side double seat to opt for 3 ambulatory passengers. Seats will be installed to provide maximum hip room while maintaining wheelchair position envelope and must comply with ADA, NYSDOT, and approved by NYCT.

Dependent on interior configuration high strength web belt and hardware wheelchair securement shall be provided at two or three positions. Each position shall feature securement for common wheelchairs and also provide lap/shoulder restraints.

Restraints shall be Q-Straint Q-8300-A1-L (QRT-Max) with flush "L" track, retractor with speed hooks and flanged "L" track to minimize tripping hazard. The QRT MAX Q-8300-A1-L consists of 12 QRT MAX Retractors (Q8-6209L) to secure the mobility aid/wheelchair with pin connectors for occupant securement – "L" track fitting attached; 3 lap and shoulder belt combination with manual height adjuster (Q8-6326-A1)

The shoulder belt reel and height adjuster will be fix mounted, no additional track fittings are required. Floor "L" track for vehicles configured to accommodate 3 wheelchairs shall be installed from left to right. Mounted storage closed containers shall be provided in each vehicle to house wheelchair securement systems when not in use, location and type to be approved by the New York City Transit.

ENTRY DOOR: The front passenger entry door shall be double out type transit bus design. The door structure shall be architectural grade aluminum, double anodized. The door shall be faced with a single sheet of tempered glass, so as to give the greatest driver visibility during operation of the bus. All brackets and screws shall be marine grade stainless steel, resistant to salt water. The door must be sufficiently rigid to reduce movement of doors under wind pressure, and not produce whistling or wind noise. The center seals should be of a design that prevents hand injuries yet mate well and do not entangle as the doors close. The door mechanism shall be manually operated from the driver's position and shall be held in the open or closed position with a passive mechanical interlock or detent. A heavy-duty school bus type manual door control at the driver's right hand and within arm's reach for a person of less than average height (5'2"). The door control linkage shall be an over the center self-locking type and mounted

ENTRY DOOR:

to the dash. Mounting shall not impede access to the driver's seat, nor shall it interfere with the removal of the engine compartment cover.

A right hand horizontally contoured handrail shall be provided as a passenger assist and door mechanism protection. Provision shall be made to heat/defrost threshold and stepwell area to enhance safety during winter operation – redirection of OEM chassis heat duct is not acceptable. Step well sub structure must be sprayed with self-etching primer or suitable sealer prior to installation and fully undercoated upon completion of vehicle.

WHEELCHAIR DOOR and EMERGENCY DOOR:

Wheelchair and emergency doors shall be weather stripped to provide comfort and noise reduction. A single leaf wheelchair entrance and exit door, with mechanical latching mechanism to be provided to retain the door in the open position when the wheelchair lift is used**.** Any locking mechanism and interlock must meet all NYSDOT and FMVSS regulations in effect at the time of manufacture. Interlock shall include visual dashboard indicator light when door is un-locked. Lift door and emergency door shall be equipped with a door ajar mechanism triggered by the movement of the 3-point door locking mechanism. Emergency door must have audible alarm when opened or ajar.

PLACARDS: All controls and accessories on the vehicle shall be clearly and permanently identified for proper operation. Such identification shall be by means of engraved plastic placards. Embossed "Dymo" style tapes are <u>not acceptable</u>.

WHEELCHAIR LIFT:

The coach shall be fitted with a right rear mounted Braun Millennium NL917FIB-HB-2, Wheelchair Lift mechanism, with a maximum lifting capacity of 800lbs. The lift shall be in full compliance with FMVSS 403/404 requirements and all current ADA requirements. The minimum platform width shall be 33 inches and equipped with standee handrails. The lift shall be designed with an automatic barrier to prevent roll-off and also to act as a ramp for entry/exit when at ground level.

The lift shall be fabricated and configured so that it will not impede free movement within the coach. The driver/attendant shall control the lift mechanism through a heavy-duty handheld hard-wired, metal-shielded remote control enabling operation from outside the coach at ground level.

WHEELCHAIR LIFT:

Enhanced safety and visibility of the wheelchair lift shall be provided by application of yellow reflective luminescent tape, part no. 25977A, to the frame on three sides.

The handrail on the wheelchair lift, which is currently a high visibility yellow, shall be enhanced with the addition of 3M 680 series diamond grade white highly reflective conspicuity tape.

The manufacturer, the carrier and Transit Inspectors shall determine the exact placement of the tape and safety lighting collectively.

Each lift shall be outfitted with a heavy-duty anti rattle lift cover, part no. 23708A913, to be installed when the lift is in the upright position.

Wheelchair lift shall have a forward installed barrier consisting of a supporting Dura-Diamond stanchion and lift barrier to prevent the insertion of fingers or arm into the lift mechanism. The wheelchair lift must be equipped with restraint belt with release buckle across grab rails.

ACCESSORIES: The coach shall be equipped with the following:

1. A Tie Tech, Inc. Safecut Webbing Cutter (seat belt cutter) shall be mounted convenient to driver and all passengers as well as to emergency rescue personnel.
2. Fire extinguisher, 5lb; ABC rated mounted convenient to the driver/attendant. First aid kit; Zee Medical #Z42, Johnson & Johnson #8172 or approved equal, mounted convenient to driver/attendant, away from the operator's head.
3. 3-piece triangular reflector hazard warning kit.
4. Handrail for all rear wheelchair position shall be located under left rear windows – size and location dependent of floor configuration and approval.
5. Overhead compartment for driver valuables, of dimensions not larger than 12" high, 12" deep and 26" long.
6. Provide ground plane for antenna and a conduit for cabling in "B" post, 1" diameter.
7. Provide front and rear mud flaps.
8. All front rear view mirrors to be manually operated, Rosco Model # 10Y64X1F00 Driver's Side Mirror, with split glass, top = 9.5" X 7" bottom = 4" X 7". The R/S Rear View Mirror shall be Part No. 10Y6Y810F0.
9. The vehicle shall be equipped with a Safe-T-Scope 7" color LCD rear camera back-up system without LUX night vision and audio.

ACCESSORIES:

10. Rosco part no. STSK7165. The monitor installation shall meet NYSDOT and any other regulatory requirement.

11. The OEM rear bumper will be replaced with a Romeo Rim rubber bumper; the ends of the bumper shall not extend beyond the body skirt panels on ether side of the vehicle.

12. The vehicle shall be equipped with "Wheel-Check" The loose wheel nut indicator on every wheel, part No. WLCH-C. The method of installation shall be approved by NYCT.
13. A driver's barrier of ¼" clear Plexiglas stamped AS12 per FMVSS 205 shall be installed from the cross bar of the driver's modesty panel within a nominal (2) inches of the ceiling allowing the driver full rearward vision of the passenger compartment while preventing passengers from reaching the driver. All attachment of this barrier shall be made into the structural support member of the vehicle.
14. Install a T.E.A.M. Driver safety assist step to provide the vehicle operator with a safer means of entrance/exiting the vehicle. As provided by Carr Pattern Company, Part No. 124871-1 Super Hoop.
15. The visibility of the rear of all vehicles shall be enhanced with the addition of a 2" wide 3M #RT2150RW series diamond grade red/white highly reflective tape across the entire width of the vehicle. Location of tape shall be determined by NYCT.
16. All chassis shall be supplied with AM/FM/Clock OEM radio with dash and or door speaker.

PASSENGER CAPACITY:

The Passenger carrying capacity shall be either of the following: (As designated by NYCT). SEATING DIAGRAMS ILLUSTRATED AT END OF THIS DOCUMENT

1. Six passengers, (3) three wheelchairs (3) three ambulatory

2. Fold down street side double seat to opt for wheelchair passenger or Ambulatory passenger

- **Note: All seating configurations must conform to ADA, NYSDOT regulations and are subject to NYCT approval.**

Replacement Parts and Components:

Vehicle manufacturer (bus body builder) is to ensure that adequate body replacement parts are manufactured in sufficient quantities to support all our operating carriers. Our individual carriers must have the capability of obtaining replacement parts to maintain their fleet roadworthiness. New York City Transit Paratransit Carriers must have the ability to obtain replacement parts directly from vehicle manufacturer and not through a distributor or third party.

MANUALS: Fifteen (15) copies of the factory service manuals including all supplementary wiring, vacuum, hydraulic or other volumes shall be supplied to the NYCT Project Manager. The copies provided can be either Digital or Hard Copy.

TRAINING: Coachbuilder shall provide training for carrier staff and NYCT personnel for diagnosis and repair of the following systems: Engine, Transmission, Wheelchair Lift, Air conditioning and Electrical systems through chassis manufacturers and after market accessory providers. The training sessions shall be a minimum of 4 hours per system and scheduled once annually, per system, for 3 years commencing with contract award. Training will conclude to the satisfaction of the NYCT Project Manager. The training will be conducted at a New York City Transit, Paratransit carrier facility or vendor/supplier locations within New York Metropolitan area.

INSPECTION: The work of manufacturing and modification may, at the NYC Transit's option, be subject to plant inspection by Transit personnel.

Transit inspectors shall have access to all parts of plants where work is being performed. They shall be given the opportunity to be present at all Tests of material and workmanship and shall have all necessary facilities to assist in their inspections. Materials used in manufacture or modification of vehicles shall be first class commercial quality and shall conform to the latest SAE and ASTM standards.

DELIVERY POINT:

Vehicle delivery locations shall be 1925 Pitkin Avenue, Brooklyn, N.Y. 11207 or 65 Commercial Street, Brooklyn, NY 11212.

WARRANTY: **Vehicle body structural warranty shall be; 5 years, 175,000 miles, which ever comes first; this applies to the following major components: The bus body, consisting of all the structure and components that make up the passenger compartment. The portion of the Ford Cab that has been modified and intergraded with the fabricated passenger compartment. The windshield frame, including the area on ether side of the front cowling, the Driver's Door, and door frame. The Ford chassis rails that support the passenger compartment. Commencement of the 5 years, 175,000-mile warranty will be the date that the vehicle is assigned to a NYCT Paratransit carrier for revenue service and not the delivery date from the manufacturer.**

COMPLIANCE TO THE DESCRIBED VEHICLE BODY STRUCTURAL WARRANTY SHALL BE ACKNOWLEDGED BY AND BE THE RESPONSIBILITY OF BOTH THE BODY MANUFACTURER AND THE REPRESENTING VEHICLE DISTRIBUTOR.

Fleet Defect: In the event that at any time prior to the expiration of the warranty period of the final Paratransit Vehicle delivered to the Authority, the Project Manager determines that cumulative failures of any kind in the same components in the same or similar application indicate the existence of a systemic design or manufacturing defect, the Project Manager may determine the existence of a fleet defect. The Contractor shall, upon five days notice from the Project Manager of such determination submit a correction plan and upon approval of such correction plan by the Project Manager shall make and implement any such design modifications, repairs, adjustment and replacement on all delivered and non-delivered Paratransit Vehicles as shall correct or prevent such failures, at no additional cost to the Authority.

Notwithstanding the absence of other specific evidence of such design or manufacturing defect, the existences of cumulative failures in a number of Paratransit Buses that exceed ten percent (10%) of all the Paratransit Buses delivered under this contract, shall in, and of itself constitute a basis for a fleet defect determination. This calculation to determine the percentage of failures shall apply at any point after acceptance of twenty (20) Paratransit Vehicles, as applicable,

Notwithstanding the date of expiration or commencement of any warranty period as to any particular bus or component, System or Subsystem, the Contractor shall retrofit/repair all units in service, and shall implement any necessary design or material modifications as to buses not yet delivered.

WARRANTY:

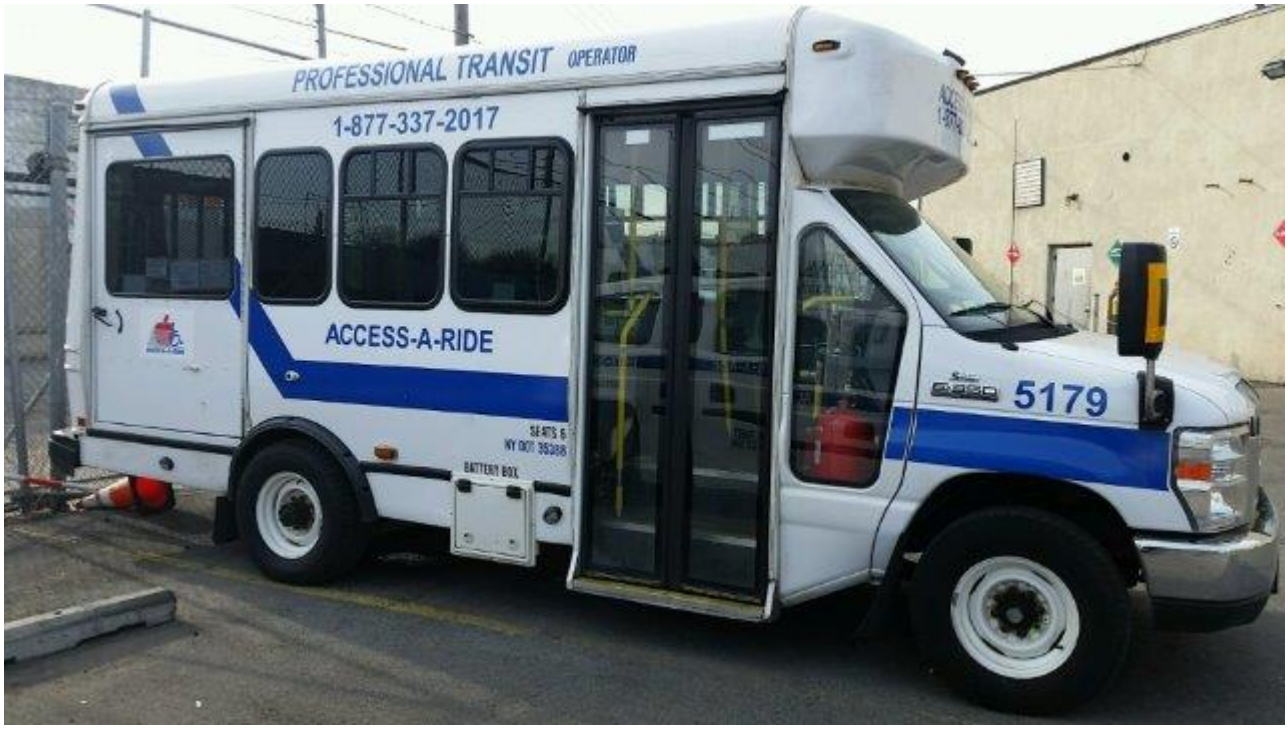
If any such retrofit/repair work is required, the warranty period as to the affected Paratransit Vehicle or component, System or Subsystem shall be extended by one (1) year from the completion of such retrofit/repair work or the expiration of the previously effective warranty period, whichever is later. If as a result of a fleet defect there is a premature failure of consumable parts, the Contractor shall provide the replacement at no additional cost to the Authority.

If replaced by the Authority, the Authority shall be reimbursed in accordance with the Authority's Schedule of rates for Services Rendered to Outside Parties in effect at the time the replacement is made.

WARRANTY REPAIRS:

Should vehicles be determined to have a fleet defect or are required to have warranty repairs or campaigns the contractor is to submit a blanket insurance certificate and furnish work crews to perform repairs at current Paratransit carrier locations within the 5 boroughs of New York City. On-site warranty repairs will be limited to the bus body manufacturer's portion of the vehicle and not the OEM Ford portion of the vehicle.

Graphics and Decals



All lettering and numbering shall be Arial Bold type fonts

Lettering

All lettering shall be 4 inches high by 3 inches wide with exception of "OPERATOR" on roof, "NY DOT", "USDOT", "SEATS' and "BATTERY BOX" letters on side of vehicle.

Lettering for "OPERATOR "on roof shall be 3 inches high by 2 inches wide.

Lettering for "NYDOT", "USDOT", "SEATS" and "BATTERY BOX" shall be 2 ½ inches high by 2 ½ inches wide.

Numbering

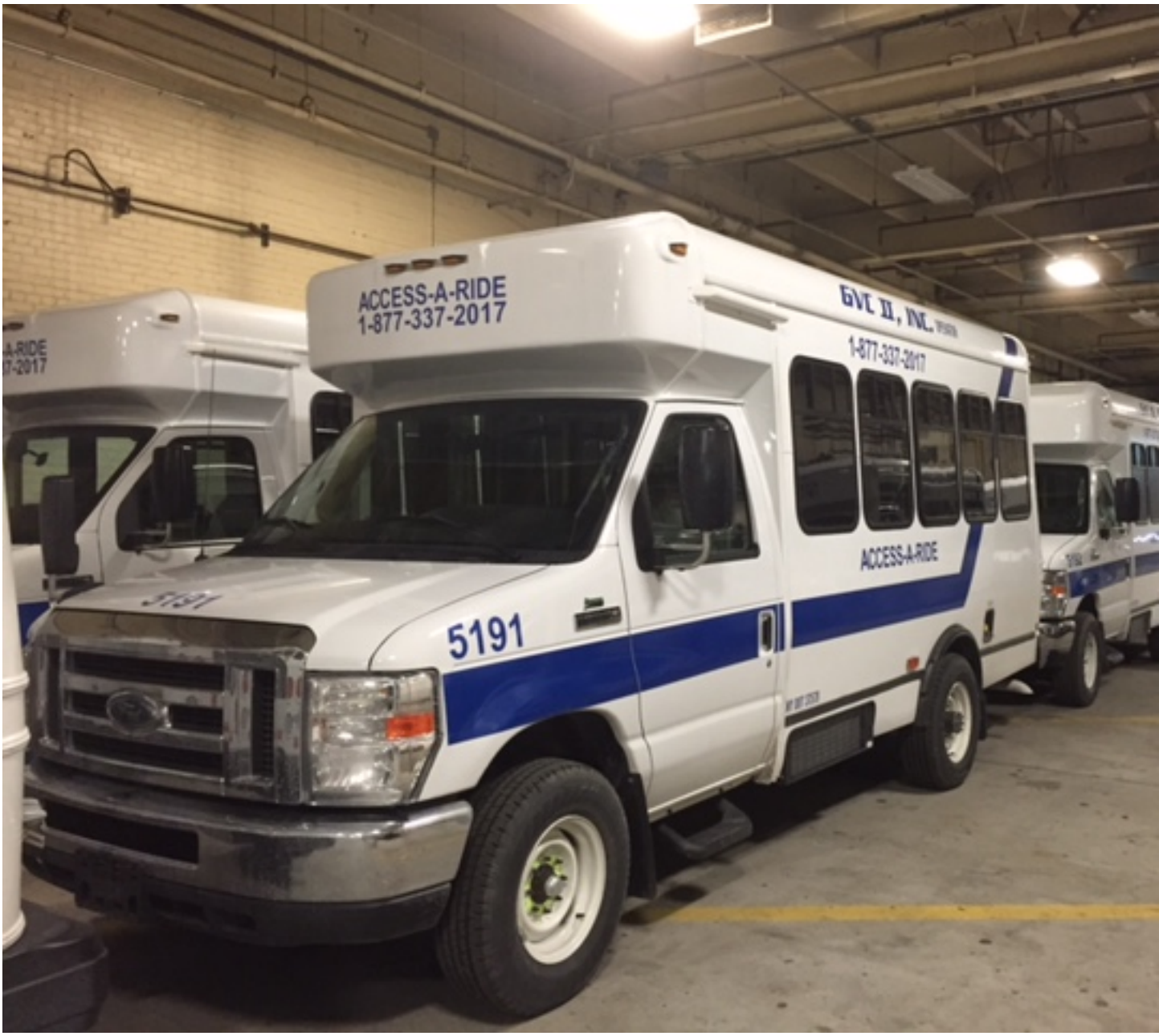
All numbering shall be 4 inches by 2 inches with exception of seating capacity "6" and carrier specific NYDOT numbers and USDOT numbers.

Seating Capacity "6", NYDOT numbers and USDOT numbers shall be 2 ½ inches high by 2 ½ inches wide.

Belt Line Stripe

Belt line stripe will be 8 inches wide and extend the side of vehicle as indicated.

Graphics and Decals



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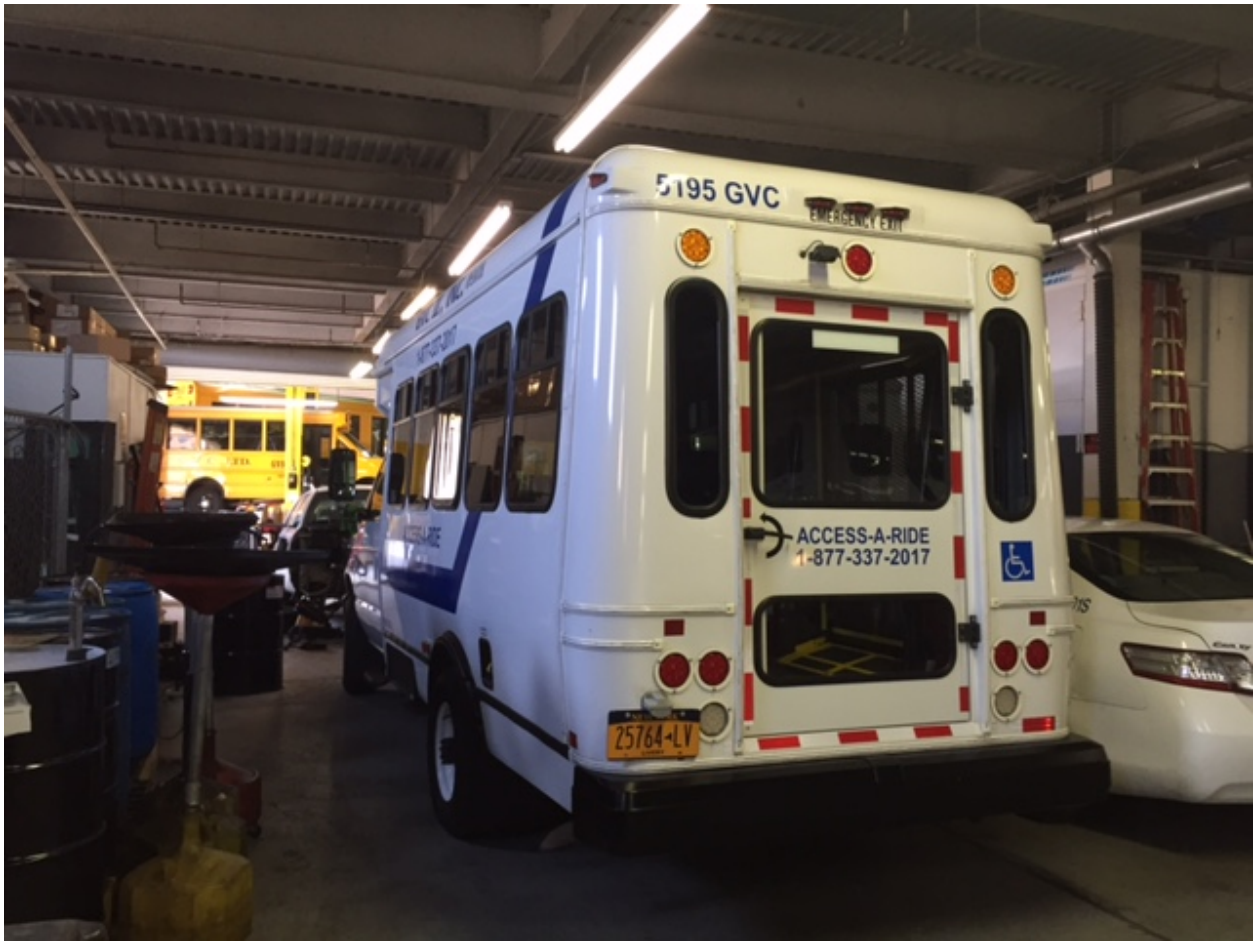

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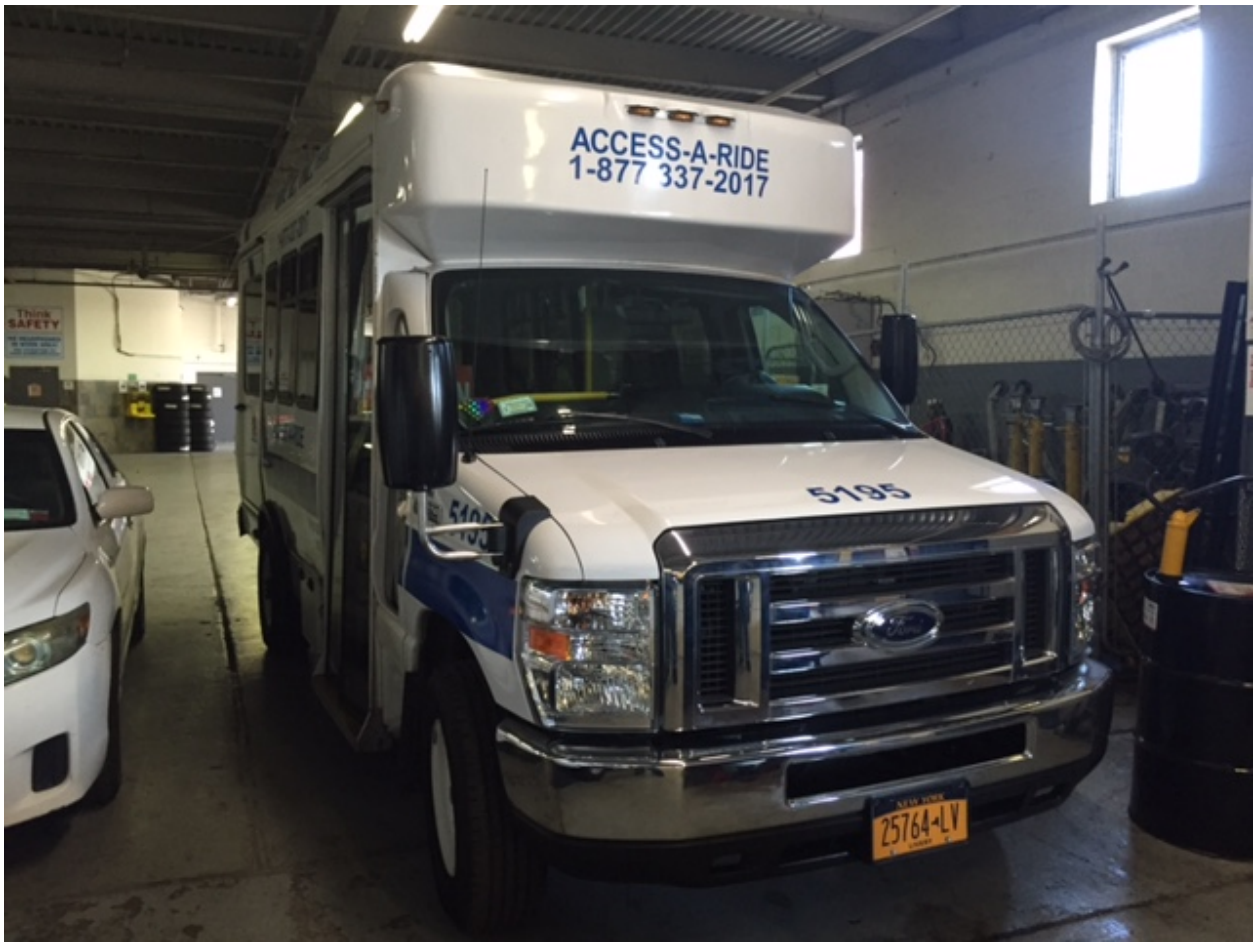
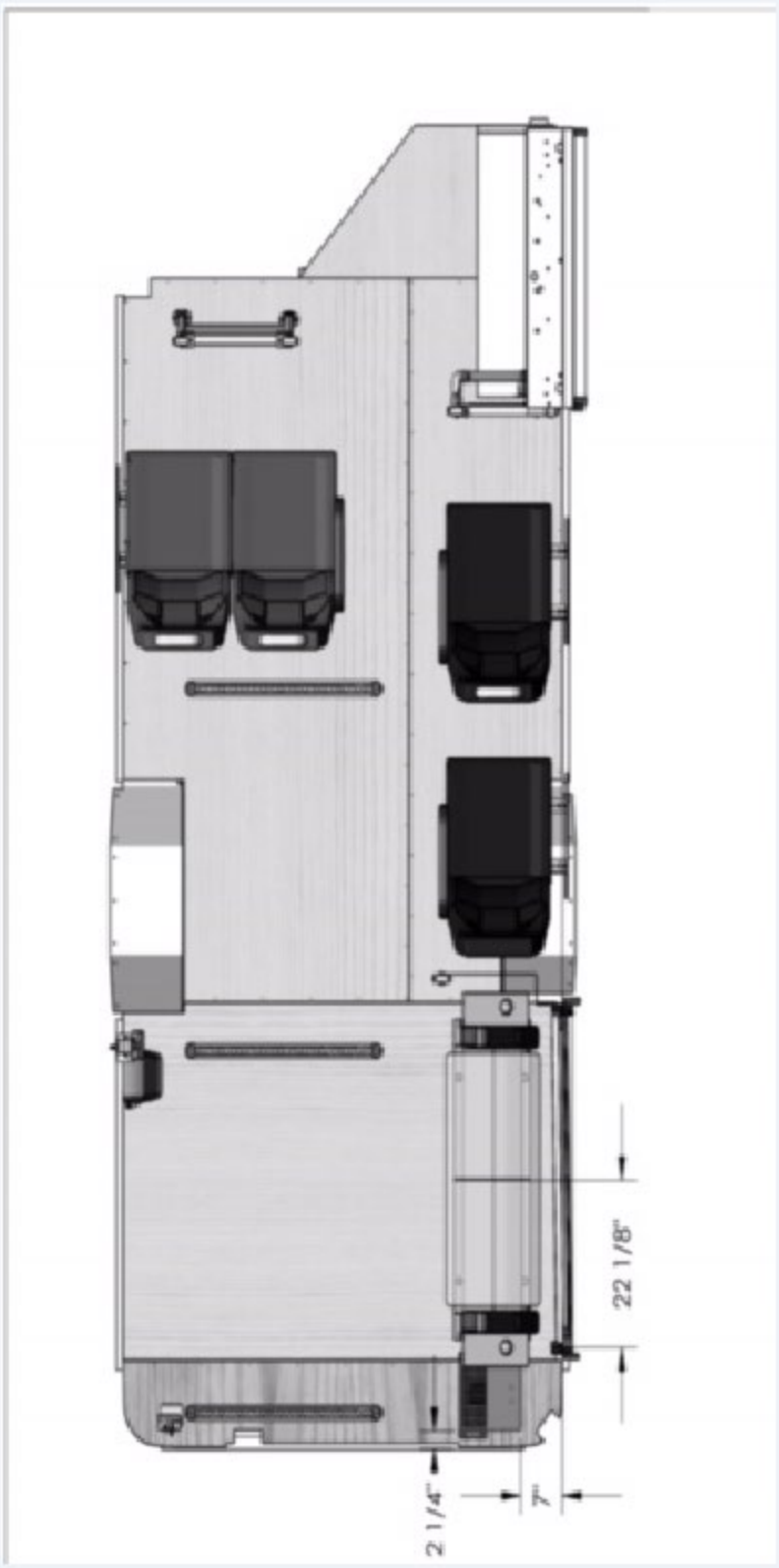


Graphics and Decals

NYCT August 2, 2021 RFI, Fully Electric 6 Passenger Paratransit Bus



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