



COMMONWEALTH of VIRGINIA

Department of General Services

Division of Purchases and Supply
1111 East Broad Street

P.O. Box 1199
Richmond, Virginia 23218-1199
(804) 786-0078
Voice/TDD (804) 786-6152

FAX (804) 225-3707

NOTICE OF AWARD

Contract Number: E194-1268

Contractor: New Flyer of America Inc

Date: July 1, 2011

Your Bid/Offer Dated: November 26, 2010

In Response To: Type I and Type II Low Floor Transit Buses

To Furnish: Transit Buses

During the Period: July 1, 2011 through June 30, 2012 (Four one-year options to renew)

Hereby is accepted at prices and terms stated, subject to all conditions and requirements of the solicitation, purchase specifications, warranties, and other stipulations, if any.

The solicitation, your bid or offer and this notice of acceptance constitute the contract.

Contract Officer: Sandra D. White

A handwritten signature in cursive script, appearing to read "S. White", written over a horizontal line.

Signature

Note: This form (or the APO) is used to award a contract.

COMBINED TWO-STEP INVITATION FOR SEALED BIDS
(IFB)

Issue Date:	September 23, 2010	IFB# E194-17-1
Title:	Type I and Type II Low Floor Transit Buses	
Commodity Code:	55600/55615	
Issuing Agency:	Commonwealth of Virginia Department of General Services Division of Purchases and Supply 1111 East Broad Street Richmond, VA 23218	
Using Agency And/Or Location Where Work Will Be Performed:	Commonwealth of Virginia Virginia Department of Rail and Public Transportation Richmond, Virginia 23219	

Term of Contract: One Year with Four One-Year Options to Renew.

Bids Will Be Received Until 1:00 P. M. on Monday, November 8, 2010 For Furnishing the Goods/Services Described Herein to be opened at 2:00 P.M. on Tuesday, November 9, 2010.

All Questions and Inquiries for Information Should Be Directed only in writing to: Sandra Smith, Contract Officer, via e-mail: sandra.smith@dgs.virginia.gov; **such inquiries must be submitted by no later than 2:00 P.M. on Friday, October 22, 2010.**

OPTIONAL PRE-BID CONFERENCE DATE: An optional pre-bid conference will be held on **Tuesday, October 12, 2010 at 10:00 A.M.,** at the Patrick Henry Building on the 1ST Floor in the Bid Tabulation Room, at 1111 East Broad Street, Richmond, VA 23218. **Refer to Section X in the IFB for details.**

In Compliance With This Invitation for Bids and To All the Conditions Imposed Therein, The Undersigned Offers and Agrees to Furnish the Goods and Services specified herein.

Name And Address Of Firm:

_____	Date: _____
_____	By: _____ (Signature In Ink)
_____ Zip Code _____	Name: _____ (Please Print)
FEI/FIN NO. _____	Title: _____
Fax Number: () _____	Telephone Number: () _____
	E-mail Address: _____

Note: This public body does not discriminate against faith-based organizations in accordance with the *Code of Virginia*, § 2.2-4343.1 or against a Bidder or Offeror because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment.

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ATTACHMENTS:

- A: Pricing Schedule Lot 1 & Lot 2
- B: Lot 1 Specifications
- C: Lot 2 Specifications
- D: Bidders Data Sheet
- E: Federal Conditions of Manufacture/Vendor
- F: New Bus Manufacturing Inspection Guidelines
- G: Transit Bus Dimension Lot 2 Type II
- H: Passenger Seating Dimensions Lot 2 Type II
- I: Passenger Door Dimensions Lot 2 Type II
- J: Lot 2 Vehicle Technical Information
- K: Lot 1 Vehicle Technical Information
- L: Bid Submission for Sealed

- I. **PURPOSE:** The purpose of this Two-Step Invitation for Bids is to solicit sealed technical responses and price bids to establish a contract with multiple qualified firms for the Type I and Type II Low Floor Transit Buses for the agency funded by the Virginia Department of Rail and Public Transportation.

- II. **SCOPE OF WORK:** It is the intent of this specification to describe the design requirements in **Attachment "B" and Attachment "C"** for Type I and Type II Low Floor Transit Buses. The floor Transit Buses must be rugged enough to withstand rigorous intensive daily transit service operations and provide maximum reliability and availability, with a minimum of maintenance and repair time. The 15 coach transit double door shall exhibit maximum passenger appeal in appearance, comfort and safety, combined with excellence in reliability, operating characteristics, efficiency, and economy of operation. It shall have a minimum expected life to 12 years or 500,000 miles, whichever comes first, and is intended for the widest possible spectrum of adult passengers, elderly, and persons with disabilities. In addition, it shall meet all federal conditions of manufacture/vendor under Attachment "E" to reference number 5, Bus Testing, but not limited; to all conditions as stated herein.

- III. **PROCESS FOR COMBINED TWO-STEP SEALED BIDDING:**
 - A. The combined two-step sealed bidding process will be used for this solicitation. Bidders must submit their responses in **separately sealed packages**, one clearly marked "Technical Response" and the other clearly marked "Price Bid." The Technical Response will be opened first and evaluated to ascertain whether the bidder's service offering, including any additional terms, is acceptable. At a later date, only the Price Bids for those Technical Responses determined to be acceptable will be opened and evaluated.

 - B. Technical Responses may include terms in addition to those set forth herein in Section VII. and Section VIII. below, provide the additional terms are not inconsistent with the terms and conditions set forth herein. **Prior to the due date for bids, bidders are strongly encouraged to submit a draft of any additional terms which are sought to be included, in order for the OAG to determine whether the terms contain any which are not acceptable.** Technical Responses which contain unacceptable terms will be rejected.

 - C. There will be no public opening of Price Bids on the bid due date only the Technical response will be opened and the names of the bidders responding will be publicly read and recorded. At a later date, after evaluation, the Price Bids for those responses evaluated as acceptable will be publicly opened at a date that will be announced to bidders and a list of bids will be made and posted. In order to be informed of the names of responding bidders, and to be advised of the Price Bid opening date, bidders should provide two self-addressed stamped envelopes with responses. Verbal or telephonic inquiries regarding the status of bids will not be accepted.

IV. **EVALUATION AND AWARD**: Evaluation and award of this contract will be done in the following manner.

A. Technical Proposal Evaluation

1. The Technical Proposal will be evaluated based on a committee review of the information provided. The committee evaluates and selects those proposals which meet its needs, based on the mandatory requirements specified in the 2STP (IFB).
2. The Evaluation may request written or oral discussions from Bidders to clarify or amplify the material in the Technical Proposal.
3. Bidders must respond to any request for clarification from DPS within the deadline specified by DPS at the time of the request.
4. Inability of DPS to reach a Bidder for clarification and/or failure of a Bidder to respond within the time stated may result in rejection of the Bidder's bid.
5. The contents of the Technical Proposal are not subject to negotiation.
6. The Technical Proposals are not ranked but are determined to be acceptable or not acceptable for meeting the needs and requirements as stated in the solicitation.
7. The following criteria will be used to evaluate the Technical Proposals includes but not limited to:
 - a. Completeness and thoroughness of the Technical Proposal
 - b. Compliance with all mandatory requirements.
 - c. Qualification of the Bidders.
 - d. Reference of the bidder.
 - e. Acceptance of the terms and conditions specified in the IFB.
8. Once the committee has determined which technical proposals and Bidders are responsive and acceptable, then the envelop containing the Price Bid shall be opened for each of these Bidders.

B. Price Bid Evaluation: The Price bids will be evaluated and it is the intent of DPS to award to the lowest responsive and responsible to multiple firms that meet the requirements of the solicitation.

V. **BIDDERS INSTRUCTIONS:**

A. Bid Submission Requirements:

1. General

- a. Although DPS reserves the right at its option to request any Bidder to submit additional information that may be necessary to clarify the bid and to submit any additional information which DPS deems necessary in order to evaluate the Bidder's bid and determine responsiveness and responsibility, there will be no negotiation.
- b. **BID SUBMISSION FOR SEALED "COMBINED TWO-STEP INVITATION FOR SEALED BIDS (IFB):** Only paper submissions will be accepted for this solicitation.
- c. Failure to completely and accurately follow all of the instructions for the combined, two steps sealed IFB process may result in rejection of the bid. Proposals should be prepared simply and economically, providing a straightforward, concise description of capabilities. Failure to submit any of the required information may result in the bid being declared non-responsive.
- d. If bidding exactly what is specified as defined in Attachment B and Attachment C, Bidders shall indicate "**Yes**" in the appropriate specification line in the column labeled "**Bid as Specified**" as a part of their Bid Response to this 2STP (IFB).
 - i. **If bidding a deviation** from any of the specifications in Attachment B or in Attachment C, the Bidder shall indicate "**No**" on the appropriate specification line in the column labeled "**Bid as Specified**" as a part of their Bid Response to this 2STP (IFB).
 - ii. For each of these instances, **the Bidder shall be required to create a separate bid attachment where each numbered line item deviation to the stated specifications.**
 - iii. **The bidder shall note and explain as to how the Bidder's respective product bid deviates from the specified product's specifications as a part of their Bid Response to this 2STP (IFB).**

2. Step One: Un-Price Technical Proposal Preparation:

- a. The Bidder shall prepare an un-priced Technical Proposal for furnishing the goods and services described in the 2STP (IFB).
- b. There shall be absolutely no pricing or cost information of any kind contained in any part of the Technical Proposal.
- c. Technical Proposal must be organized and prepared as described in the section. Technical Proposals that are not organized and prepared in this manner may be eliminated from consideration by DPS at any time, AT DPS's sole discretion.
- d. The Technical Proposal shall be completed and comprehensive, with an emphasis on being concise and clear. Incomplete responses to IFB statements and requirements and responses the lack content and necessary detail are grounds for rejection by DPS at any time, at DPS's sole discretion.
- e. Elaborate bindings or literature are not necessary, but all documents must be clear and legible. Technical Proposals with poor quality copies of materials may be rejected.
- f. Bidders must prepare and organized, concise Technical Proposal that addresses each of the requirements. The Technical Proposal shall have four (4) sections and be organized ad follows:
 - i. Section 1) Narrative Response
 - ii. Section 2) Specification Response
 - iii. Section 3) Qualifications/Experience.
 - iv. Section 4) Additional Material from Bidder (If applicable)
- g. Section 1 – Narrative Response.
 - i. This Section must be in narrative form and contain all necessary and relevant information for DPS to determine that the Bidder meets the stated requirements.
 - ii. Section 1 – Narrative response shall describe the means and methods for providing goods and services per the requirements of the IFB and what goods, equipment, and service, as applicable, will be furnished.
 - iii. Each paragraph in Section 1 – Narrative Response shall reference the IFB section number in the corresponding section of the IFB.
 - iv. The Bidder shall repeat the IFB section number, sub-number, and text of the requirement as it appears in the IFB.

- v. If a response covers more than one page, the Bidder must repeat the IFB section number and sub-letter at the top of the subsequent page.
- vi. In Section 1 – Narrative response, the Bidder shall respond to each section of the IFB.
 - The Bidder shall describe and explain in detail their proposed products and solutions and how the products and solutions meet the requirements stated in the IFB.
 - All pages in Section 1 must include the IFB number and page numbered.
 - The Narrative Response will all pages contained in Section 1 must be placed behind a separate tab in the Technical Proposal entitled “Section 1 – Narrative Response”.
- h. Section 2 – Supporting Documentation.
 - i. The Bidder may include additional supporting documentation with the Technical Proposal.
 - ii. The supporting documentation will be used by DPS for evaluation purposes.
 - iii. Supporting documentation for all proposed products must be made available. If requested by the evaluation committee, within deadlines provided by DPS.
 - iv. The Bidder may include additional supporting documentation with the Technical Proposal.
 - v. For all supporting documentation pages must be paged numbered and placed behind a separate tab in the Technical Proposal entitled “Section 2 – Supporting Documentation”.
- i. Section 3 – Qualifications and Experience
 - i. The Bidder shall fully describe your firm’s qualifications and experience in providing the services described herein to included:
 - A brief overview of your firm’s business structure and the relationship between any parent company and subsidiaries, if applicable to your firm and whether there are any planned mergers or company structure changes.

- Identify previous and current contracts similar to this project.
 - Address your firm's current financial status to clarify your firm's financial stability and solvency during the contract period.
 - Provide your firm's website if applicable where more information can be obtained regarding your firm.
 - Include **Attachment "D"**, Bidder Data Sheet and clearly identify all reference contact information as requested.
- ii. The Bidder may provide additional information on their qualifications and experience in this section.
- iii. All pages contained in Section 3 must be placed behind a separate tab in the Technical Proposal entitled Section 3 – Qualifications and Experience”.
- j. Section 4 – Additional Material from Bidder (If applicable)
- i. Additional information which the Bidder desires to present should be attached at the end of the Technical Proposal and designated as additional material.
 - ii. In this section, the Bidder may include terms and conditions which are sought to be included in addition to those set for herein in **sections VI and VII**, provided the Bidder's additional terms do not conflict with the terms and conditions in Section **VI and VII** or with any of the IFB requirements. If the Commonwealth, in its sole discretion, determines that any of the Bidder's additional terms are in conflict with the terms in Sections VI and VI or with any of the IFB requirements, the Bidder will be required to immediately remove them from their bid, and if they are not immediately removed the entire bid will be rejected and determined to be nonresponsive. Note: There will be no negotiation of terms and conditions.
 - iii. The Bidder shall create a separate tab for this additional material and entitle it “Section 4 – Additional Material from Bidder”.
 - iv. All pages contained in Section 4 must be placed behind a separate tab in the Technical Proposal entitled Section 4 – Qualifications and Experience”.

- v. A cover memo must be included as the first page in this section to describe the contents of Section 4 and what IFB requirements are addressed by the additional material.

3. Step Two: Price Bid Preparation:

- a. The Bidder shall prepare a separate Price Bid for furnishing the goods and services described in the unpriced Technical Proposal.
- b. Refer to IFB Attachment "A" for specific instruction on how to prepare the Price Bid.
- c. Please note: There will be no public opening of Price Bids on the bid opening date November 9, 2010, only the Technical Proposal will be opened and the names of the Bidders responding will be read and recorded.

4. Identification of bid Envelops:

- a. The unpriced Technical Proposal must be placed in an envelop SEPARATE from the Price Bid, sealed and marked "Technical Proposal".
- b. Price Bid must be placed in an envelop SEPARATE from the Technical proposal sealed and marked "Price Bid".
- c. The separate sealed envelopes, containing the unpriced Technical Proposal and Price Bid must be clearly marked and identified with the Bidder's name, company name and address, and IFB number.
- d. The envelop or package must be addressed as specified on the cover page of this IFB.
- e. The Bidder's name, company name, address, the IFB number and closing date must be clearly marked on the outside of the sealed envelopes.
- f. No other correspondence or other bids/proposals should be placed in the envelope.

5. Submission of Bids:

- a. The sealed envelope containing the unpriced Technical Proposal and the separate sealed envelop containing the Price Bid must be submitted together (combined) on the same date and time) on or before the bid due date and time).
- b. The Bidder is required to submit the following items in order for their bid to be complete and accepted by DPS.

- i. The IFB signature sheet, signed, containing the name of the primary contact person for this bid, their address, e-mail, facsimile number, and telephone number. Submit this as the cover page for the Technical Proposal and also as the cover page of the Price Bid.
 - ii. All IFB addenda acknowledgements, if any, signed and filled out as required. Submit this behind the cover page in the Technical Proposal.
 - iii. The completed bid (Step 1 Technical Proposal and Step 2 Price Bid) including all specific items or data requested in the IFB and any addenda).
- c. In order to be considered for selection, the Bidder must submit a complete response to this IFB.
- d. All information requested in the IFB must be submitted. Failure to submit all information requested may result in DPS eliminating the Bidder's bid from consideration, at DPS's sole discretion.
- e. The Bidder shall submit their entire bid to DPS as follows:
 - i. One (1) complete original bid (Step 1 Technical Proposal and Step 2 Price Bid).
 - ii. Seven (7) copies of the complete original bid (Step 1 Technical Proposal and Step 2 Price Bid).
- f. DPS will not compensate the bidder for the cost of bid preparation whether or not an award is made.
- g. **No Electronic Submission Will Be Accepted.** When submitting a paper response to a solicitation, the bidder shall return the signed response in a sealed envelope. The envelope should be addressed and delivered to the Commonwealth of Virginia, Department of General Services, Division of Purchases and Supply, Bid Tabulation, 1st Floor, 1111 East Broad Street, Richmond, VA 23219.
- h. Bids may also be hand delivered to Department of General Services, Division of Purchases and Supply, Bid Tabulation Room, 1st Floor, at 1111 East Broad Street, Richmond, VA 23219. The envelope should also provide the following information: Name of Bidder, Street or Box Number, City, State, Zip Code; and Solicitation Close Date and Time, Solicitation No., Solicitation Description, and Contract/Purchase Officer.
- i. If a solicitation response is not contained in an envelope as described above the bidder takes the risk that the envelope may be inadvertently opened and the information compromised which may cause the bid to be disqualified. No other un-requested correspondence or other bids should be placed in the envelope. It is the Vendor's responsibility to make certain responses are at the correct address when Bids are due. Bids not at the

specified location by or before the specified time and date of closing WILL NOT be accepted, even if they are elsewhere in the building.

- j. **NOTE: FAXED BIDS ARE NOT ACCEPTED.**
- k. Bids will not be accepted after the closing date and time. Bids received after the closing date and time will be returned unopened.
- l. Ownership of all data, materials, and documentation originated and prepared for DPS pursuant to the IFB shall belong exclusively to DPS and be subject to public inspection in accordance with the Virginia Freedom of Information Act.
- m. Trade secrets/proprietary information submitted by a Bidder shall not be subject to the public disclosure under the Virginia Freedom of Information Act;
 - i. However, the bidder must invoke the protection of §2.2-4342(F) of the Code of Virginia, in writing, either before or at the time the data or other material is submitted.
 - ii. The written notice must specifically identify the data or materials to be protected and state the reasons why protection is necessary and be submitted. Submit this behind the cover page in the technical Proposal.
 - iii. The proprietary or trade secret material submitted in the bid must be identified by some distinct method such as highlighting or underlining and must indicate only the specific words, figures, or paragraphs that constitute trade secret or proprietary information.
 - iv. The classification of an entire bid document, line item prices, and/or total bid prices as proprietary or trade secrets is not acceptable and may result in rejection of the bid. This instruction applies to all supplemental information that may be provided by the Bidder after the original bid submission for the duration of the procurement process.
 - v. This information will remain confidential into perpetuity.

VI. **METHOD OF AWARD:** Following the opening of the price bids in accordance with the process above, an award will be made based on the lowest responsive and responsible bid for **each line item**. The Commonwealth reserves the right to reject any or all bids, in whole or in part, to waive informalities and to delete items prior to making the award, whenever it is deemed in the sole opinion of the Commonwealth to be in its best interest.

VII. **GENERAL TERMS AND CONDITIONS**

The following are mandatory General Terms and Conditions. Bidders shall indicate compliance in their Technical Response.

- A. VENDORS MANUAL: This solicitation is subject to the provisions of the Commonwealth of Virginia *Vendors Manual* and any changes or revisions thereto, which are hereby incorporated into this contract in their entirety. The procedure for filing contractual claims is in section 7.19 of the *Vendors Manual*. A copy of the manual is normally available for review at the purchasing office and is accessible on the Internet at www.dgs.state.va.us/dps under "Manuals."
- B. APPLICABLE LAWS AND COURTS: This solicitation and any resulting contract shall be governed in all respects by the laws of the Commonwealth of Virginia and any litigation with respect thereto shall be brought in the courts of the Commonwealth. The Contractor shall comply with all applicable federal, state and local laws, rules and regulations.
- C. ANTI-DISCRIMINATION: By submitting their bids, bidders certify to the Commonwealth that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act and § 2.2-4311 of the *Virginia Public Procurement Act (VPPA)*. If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body. (*Code of Virginia*, § 2.2-4343.1E).

In every contract over \$10,000 the provisions in 1. and 2. below apply:

1. During the performance of this contract, the Contractor agrees as follows:
 - a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
 - b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.
 - c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting these requirements.
2. The Contractor will include the provisions of 1. above in every subcontract or purchase order over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

- D. ETHICS IN PUBLIC CONTRACTING: By submitting their bids, bidders certify that their bids are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other bidder, supplier, manufacturer or subcontractor in connection with their bid, and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.
- E. IMMIGRATION REFORM AND CONTROL ACT OF 1986: By submitting their bids, bidders certify that they do not and will not during the performance of this contract employ illegal alien workers or otherwise violate the provisions of the federal Immigration Reform and Control Act of 1986.
- F. DEBARMENT STATUS: By submitting their bids, bidders certify that they are not currently debarred by the Commonwealth of Virginia from submitting bids or proposals on contracts for the type of goods and/or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred.
- G. ANTITRUST: By entering into a contract, the Contractor conveys, sells, assigns, and transfers to the Commonwealth of Virginia all rights, title and interest in and to all causes of action it may now have or hereafter acquire under the antitrust laws of the United States and the Commonwealth of Virginia, relating to the particular goods or services purchased or acquired by the Commonwealth of Virginia under said contract.
- H. MANDATORY USE OF STATE FORM AND TERMS AND CONDITIONS: Failure to submit a bid in the format provided for that purpose shall be a cause for rejection of the bid. Modification of or additions to any portion of the Invitation for Bids may be cause for rejection of the bid; however, the Commonwealth reserves the right to decide, on a case by case basis, in its sole discretion, whether to reject such a bid as nonresponsive. As a precondition to its acceptance, the Commonwealth may, in its sole discretion, request that the bidder withdraw or modify nonresponsive portions of a bid which do not affect quality, quantity, price, or delivery. No modification of or addition to the provisions of the contract shall be effective unless reduced to writing and signed by the parties.
- I. CLARIFICATION OF TERMS: If any prospective bidder has questions about the specifications or other solicitation documents, the prospective bidder should contact the buyer whose name appears on the face of the solicitation no later than five working days before the due date. Any revisions to the solicitation will be made only by addendum issued by the buyer.
- J. PAYMENT:
1. To Prime Contractor:
 - a. Invoices for items ordered, delivered and accepted shall be submitted by the Contractor directly to the payment address shown on the purchase order/contract. All invoices shall show the state contract number and/or purchase order number; social security number (for individual contractors) or the federal employer identification number (for proprietorships, partnerships, and corporations).

- b. Any payment terms requiring payment in less than 30 days will be regarded as requiring payment 30 days after invoice or delivery, whichever occurs last. This shall not affect offers of discounts for payment in less than 30 days, however.
 - c. All goods or services provided under this contract or purchase order, that are to be paid for with public funds, shall be billed by the Contractor at the contract price, regardless of which public agency is being billed.
 - d. The following shall be deemed to be the date of payment: the date of postmark in all cases where payment is made by mail, or the date of offset when offset proceedings have been instituted as authorized under the Virginia Debt Collection Act.
 - e. **Unreasonable Charges.** Under certain emergency procurements and for most time and material purchases, final job costs cannot be accurately determined at the time orders are placed. In such cases, contractors should be put on notice that final payment in full is contingent on a determination of reasonableness with respect to all invoiced charges. Charges which appear to be unreasonable will be researched and challenged, and that portion of the invoice held in abeyance until a settlement can be reached. Upon determining that invoiced charges are not reasonable, the Commonwealth shall promptly notify the contractor, in writing, as to those charges which it considers unreasonable and the basis for the determination. A contractor may not institute legal action unless a settlement cannot be reached within thirty (30) days of notification. The provisions of this section do not relieve an agency of its prompt payment obligations with respect to those charges which are not in dispute (*Code of Virginia, § 2.2-4363*).
2. **To Subcontractors:**
- a. A contractor awarded a contract under this solicitation is hereby obligated:
 - 1) To pay the subcontractor(s) within seven (7) days of the Contractor's receipt of payment from the Commonwealth for the proportionate share of the payment received for work performed by the subcontractor(s) under the contract; or
 - 2) To notify the agency and the subcontractor(s), in writing, of the Contractor's intention to withhold payment and the reason.
 - b. The Contractor is obligated to pay the subcontractor(s) interest at the rate of one percent per month (unless otherwise provided under the terms of the contract) on all amounts owed by the Contractor that remain unpaid seven (7) days following receipt of payment from the Commonwealth, except for amounts withheld as stated in (2) above. The date of mailing of any payment by U. S. Mail is deemed to be payment to the addressee. These provisions apply to each sub-tier contractor performing under the primary contract. A contractor's obligation to pay an interest charge to a subcontractor may not be construed to be an obligation of the Commonwealth.
- K. **PRECEDENCE OF TERMS:** Paragraphs A-J of these General Terms and Conditions shall apply in all instances. In the event there is a conflict between any of the other General Terms and Conditions and any Special Terms and Conditions in this solicitation, the Special Terms and Conditions shall apply.

- L. QUALIFICATIONS OF BIDDERS: The Commonwealth may make such reasonable investigations as deemed proper and necessary to determine the ability of the bidder to perform the services/furnish the goods and the bidder shall furnish to the Commonwealth all such information and data for this purpose as may be requested. The Commonwealth reserves the right to inspect bidder's physical facilities prior to award to satisfy questions regarding the bidder's capabilities. The Commonwealth further reserves the right to reject any bid if the evidence submitted by, or investigations of, such bidder fails to satisfy the Commonwealth that such bidder is properly qualified to carry out the obligations of the contract and to provide the services and/or furnish the goods contemplated therein.
- M. TESTING AND INSPECTION: The Commonwealth reserves the right to conduct any test/inspection it may deem advisable to assure goods and services conform to the specifications.
- N. ASSIGNMENT OF CONTRACT: A contract shall not be assignable by the Contractor in whole or in part without the written consent of the Commonwealth.
- O. CHANGES TO THE CONTRACT: Changes can be made to the contract in any of the following ways:
1. The parties may agree in writing to modify the scope of the contract. An increase or decrease in the price of the contract resulting from such modification shall be agreed to by the parties as a part of their written agreement to modify the scope of the contract.
 2. The agency may order changes within the general scope of the contract at any time by written notice to the Contractor. Changes within the scope of the contract include, but are not limited to, things such as services to be performed, the method of packing or shipment, and the place of delivery or installation. The Contractor shall comply with the notice upon receipt. The Contractor shall be compensated for any additional costs incurred as the result of such order and shall give the agency a credit for any savings. Said compensation shall be determined by one of the following methods:
 - a. By mutual agreement between the parties in writing; or
 - b. By agreeing upon a unit price or using a unit price set forth in the contract, if the work to be done can be expressed in units, and the Contractor accounts for the number of units of work performed, subject to the agency's right to audit the Contractor's records and/or to determine the correct number of units independently; or
 - c. By ordering the Contractor to proceed with the work and keep a record of all costs incurred and savings realized. A markup for overhead and profit may be allowed if provided by the contract. The same markup shall be used for determining a decrease in price as the result of savings realized. The Contractor shall present the agency with all vouchers and records of expenses incurred and savings realized. The agency shall have the right to audit the records of the Contractor as it deems necessary to determine costs or savings. Any claim for an adjustment in price under this provision must be asserted by written notice to the agency within thirty (30) days from the date of receipt of the written order

from the agency. If the parties fail to agree on an amount of adjustment, the question of an increase or decrease in the contract price or time for performance shall be resolved in accordance with the procedures for resolving disputes provided by the Disputes Clause of this contract or, if there is none, in accordance with the disputes provisions of the Commonwealth of Virginia *Vendors Manual*. Neither the existence of a claim nor a dispute resolution process, litigation or any other provision of this contract shall excuse the Contractor from promptly complying with the changes ordered by the agency or with the performance of the contract generally.

- P. **DEFAULT:** In case of failure to deliver goods or services in accordance with the contract terms and conditions, the Commonwealth, after due oral or written notice, may procure them from other sources and hold the Contractor responsible for any resulting additional purchase and administrative costs. This remedy shall be in addition to any other remedies which the Commonwealth may have.
- Q. **TAXES:** Sales to the Commonwealth of Virginia are normally exempt from State sales tax. State sales and use tax certificates of exemption, Form ST-12, will be issued upon request. Deliveries against this contract shall usually be free of Federal excise and transportation taxes. The Commonwealth's excise tax exemption registration number is 54-73-0076K.
- R. **BRAND NAMES:** n/a
- S. **TRANSPORTATION AND PACKAGING:** n/a
- T. **INSURANCE:** By signing and submitting a bid or proposal under this solicitation, the bidder or offeror certifies that if awarded the contract, it will have the following insurance coverages at the time the contract is awarded. For construction contracts, if any subcontractors are involved; the subcontractor will have workers' compensation insurance in accordance with Sections 11-46.3 and 65.2-800 et seq. of the *Code of Virginia*. The bidder further certifies that the Contractor and any subcontractors will maintain these insurance coverages during the entire term of the contract and that all insurance coverages will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission.

INSURANCE COVERAGE AND LIMITS REQUIRED:

1. Worker's Compensation – Statutory requirements and benefits.
2. Employers Liability - \$100,000.
3. Commercial General Liability - \$500,000 combined single limit. Commercial General Liability is to include Premises/Operations Liability, Products and Completed Operations Coverage, and Independent Contractor's Liability or Owner's and Contractor's Protective Liability. The Commonwealth of Virginia must be named as an additional insured when requiring Contractor to obtain Commercial General Liability coverage.

- U. ANNOUNCEMENT OF AWARD: Upon the award or the announcement of the decision to award a contract as a result of this solicitation, the purchasing agency will publicly post such notice on the DGS/DPS eVA web site (www.eva.state.va.us) for a minimum of 10 days.
- V. DRUG-FREE WORKPLACE: During the performance of this contract, the Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "*drug-free workplace*" means a site for the performance of work done in connection with a specific contract awarded to a Contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

- W. NONDISCRIMINATION OF CONTRACTORS: A bidder, offeror, or contractor shall not be discriminated against in the solicitation or award of this contract because of race, religion, color, sex, national origin, age, or disability, or against faith-based organizations. If the award of this contract is made to a faith-based organization and an individual, who applies for or receives goods, services, or disbursements provided pursuant to this contract objects to the religious character of the faith-based organization from which the individual receives or would receive the goods, services, or disbursements, the public body shall offer the individual, within a reasonable period of time after the date of his objection, access to equivalent goods, services, or disbursements from an alternative provider.
- X. eVA BUSINESS-TO-GOVERNMENT VENDOR REGISTRATION: The eVA Internet electronic procurement solution, web site portal www.eva.state.va.us, streamlines and automates government purchasing activities in the Commonwealth. The portal is the gateway for vendors to conduct business with state agencies and public bodies.

All vendors desiring to provide goods and/or services to the Commonwealth shall participate in the eVA Internet e-procurement solution either through the eVA Basic Vendor Registration Service or eVA Premium Vendor Registration Service, and complete the Ariba Commerce Services Network registration.

Vendors are strongly encouraged to register prior to submitting a bid or offer. Failure to register prior to award will result in the bid being found non-responsive and rejected. All vendors must register in both the eVA and the Ariba Commerce Services Network Vendor Registration Systems.

- a. eVA Basic Vendor Registration Service: \$25 Annual Fee plus a Transaction Fee of 1% per order received. The maximum transaction fee is \$500 per order. eVA

Basic Vendor Registration Service includes electronic order receipt, vendor catalog posting, on-line registration, and electronic bidding, as they become available.

b. eVA Premium Vendor Registration Service: \$200 Annual Fee plus a Transaction Fee of 1% per order received. The maximum transaction fee is \$500 per order. eVA Premium Vendor Registration Service includes all benefits of the eVA Basic Vendor Registration Service plus automatic email or fax notification of solicitations and amendments, and ability to research historical procurement data, as they become available.

c. Ariba Commerce Services Network Registration. The Ariba Commerce Services Network (ACSN) registration is required and provides the tool used to transmit information electronically between state agencies and vendors. There is no additional fee for this service.

VIII. **SPECIAL TERMS AND CONDITIONS:** Bidders shall indicate compliance with the following in their Technical Response. Bidders may include in their Technical Response any additional terms to be considered by the OAG, so long as the additional terms sought are not inconsistent with any of the terms expressed herein.

A. **ADVERTISING** In the event a contract is awarded for supplies, equipment, or services resulting from this bid/proposal, no indication of such sales or services to the Commonwealth of Virginia will be used in product literature or advertising. The contractor shall not state in any of its advertising or product literature that the Commonwealth of Virginia has purchased or uses any of its products or services, and the contractor shall not include the Commonwealth of Virginia in any client list in advertising and promotional materials.

B. **AUDIT:** The contractor shall retain all books, records, and other documents relative to this contract for five (5) years after final payment, or until audited by the Commonwealth of Virginia, whichever is sooner. The agency, its authorized agents, and/or state auditors shall have full access to and the right to examine any of said materials during said period.

C. **ADDITIONAL USERS:** This procurement is being conducted on behalf of state agencies, institutions and other public bodies who may be added or deleted at anytime during the period of the contract. The addition or deletion of authorized users not specifically named in the solicitation shall be made only by written contract modification issued by this agency or institution and upon mutual agreement of the contractor. Such modification shall name the specific agency added or deleted and the effective date. The contractor shall not honor an order citing the resulting contract unless the ordering entity has been added by written contract modification.

D. **AWARD TO MULTIPLE BIDDERS:** The Commonwealth reserves the right to make multiple awards as a result of this solicitation. The award(s) will be made to the lowest responsive and responsible bidder(s) meeting the requirements of the solicitation. The Commonwealth reserves the right to conduct any tests it may deem advisable and to make all evaluations. The Commonwealth also reserves the right to reject any or all bids, in whole or in part, to waive

informalities and to delete items prior to making the award, whenever it is deemed in the sole opinion of the procuring public body to be in its best interest.

- E. AWARD TO OTHER THAN THE LOWEST PRICED BIDDER(S): An award(s) will be made to the lowest responsive and responsible bidder(s) however; the award may be made to a reasonably priced DMBE-certified small business bidder(s) that is other than the lowest priced bidder(s). Evaluation will be based on net prices. Unit prices, extensions and grand total must be shown. In case of arithmetic errors, the unit price will govern. If cash discount for prompt payment is offered, it must be clearly shown in the space provided. Discounts for prompt payment will not be considered in making awards. The right is reserved to make a separate award of each item, a group of items or all items, and to make an award either in whole or in part, whichever is deemed in the best interest of the Commonwealth. The State reserves the right to reject any and all bids in whole or in part, to waive any informality, and to delete items prior to making an award.
- F. BID ACCEPTANCE PERIOD: Any bid in response to this solicitation shall be valid for (90) days. At the end of the (90) days the bid may be withdrawn at the written request of the bidder. If the bid is not withdrawn at that time it remains in effect until an award is made or the solicitation is canceled.
- G. CANCELLATION OF CONTRACT: The purchasing agency reserves the right to cancel and terminate any resulting contract, in part or in whole, without penalty, upon 60 days written notice to the contractor. In the event the initial contract period is for more than 12 months, the resulting contract may be terminated by either party, without penalty, after the initial 12 months of the contract period upon 60 days written notice to the other party. Any contract cancellation notice shall not relieve the contractor of the obligation to deliver and/or perform on all outstanding orders issued prior to the effective date of cancellation.
- H. CONTRACTOR/SUBCONTRACTOR LICENSE REQUIREMENT: By my signature on this solicitation, I certify that this firm/individual and subcontractor is properly licensed for providing the goods/services specified.

Contractor Name: _____

Subcontractor Name: _____

License # _____ Type _____

- I. SPECIAL EDUCATIONAL OR PROMOTIONAL DISCOUNTS: The contractor shall extend any special educational or promotional sale prices or discounts immediately to the Commonwealth during the term of the contract. Such notice shall also advise the duration of the specific sale or discount price.
- J. IDENTIFICATION OF BID/PROPOSAL ENVELOPE: If a special envelope is not furnished, or if return in the special envelope is not possible, the signed bid/proposal should be returned in a separate envelope or package, sealed and identified as follows:

- K. **INDEMNIFICATION:** Contractor agrees to indemnify, defend and hold harmless the Commonwealth of Virginia, its officers, agents, and employees from any claims, damages and actions of any kind or nature, whether at law or in equity, arising from or caused by the use of any materials, goods, or equipment of any kind or nature furnished by the contractor/any services of any kind or nature furnished by the contractor, provided that such liability is not attributable to the sole negligence of the using agency or to failure of the using agency to use the materials, goods, or equipment in the manner already and permanently described by the contractor on the materials, goods or equipment delivered.
- L. **INSTALLATION:** All items must be assembled and set in place, ready for use. All crating and other debris must be removed from the premises.
- M. **MAINTENANCE MANUALS:** The contractor shall provide with each piece of equipment an operations and maintenance manual with wiring diagrams, parts list, and a copy of all warranties.
- N. **SMALL BUSINESS SUBCONTRACTING AND EVIDENCE OF COMPLIANCE:**

A. It is the goal of the Commonwealth that 40% of its purchases be made from small businesses. This includes discretionary spending in prime contracts and subcontracts. All potential bidders are required to submit a Small Business Subcontracting Plan. Unless the bidder is registered as a DMBE-certified small business and where it is practicable for any portion of the awarded contract to be subcontracted to other suppliers, the contractor is encouraged to offer such subcontracting opportunities to DMBE-certified small businesses. This shall not exclude DMBE-certified women-owned and minority-owned businesses when they have received DMBE small business certification. No bidder or subcontractor shall be considered a Small Business, a Women-Owned Business or a Minority-Owned Business unless certified as such by the Department of Minority Business Enterprise (DMBE) by the due date for receipt of bids or proposals. If small business subcontractors are used, the prime contractor agrees to report the use of small business subcontractors by providing the purchasing office at a minimum the following information: name of small business with the DMBE certification number, phone number, total dollar amount subcontracted, category type (small, women-owned, or minority-owned), and type of product/service provided.

B. Each prime contractor who wins an award in which provision of a small business subcontracting plan is a condition of the award, shall deliver to the contracting agency or institution on a monthly basis, evidence of compliance (subject only to insubstantial shortfalls and to shortfalls arising from subcontractor default) with the small business subcontracting plan. When such business has been subcontracted to these firms and upon completion of the contract, the contractor agrees to furnish the purchasing office at a minimum the following information: name of firm with the DMBE certification number, phone number, total dollar amount subcontracted, category type (small, women-owned, or minority-owned), and type of product or service provided. Payment(s) may be withheld until compliance with the plan is received and confirmed by the agency or institution. The agency or institution reserves the right to pursue other

appropriate remedies to include, but not be limited to, termination for default.

C. Each prime contractor who wins an award valued over \$200,000 shall deliver to the contracting agency or institution on a monthly basis, information on use of subcontractors that are not DMBE-certified small businesses. When such business has been subcontracted to these firms and upon completion of the contract, the contractor agrees to furnish the purchasing office at a minimum the following information: name of firm, phone number, total dollar amount subcontracted, and type of product or service provided.

- O. PREVENTIVE MAINTENANCE: The contractor shall provide necessary preventive maintenance, required testing and inspection, calibration and/or other work necessary to maintain the equipment in complete operational condition during the warranty period.
- P. PRICE ESCALATION/DE-ESCALATION: Price adjustments may be permitted for changes in the contractor's cost of materials not to exceed the increase in the following CPI index/indices: Mass Transportation. No price increases will be authorized for 180 calendar days after the effective date of the contract. Price escalation may be permitted only at the end of this period and each 180 days thereafter and only where verified to the satisfaction of the purchasing office. However, "across the board" price decreases are subject to implementation at any time and shall be immediately conveyed to the Commonwealth.

Contractor shall give not less than 30 days advance notice of any price increase to the purchasing office. Any approved price changes will be effective only at the beginning of the calendar month following the end of the full 30 day notification period. The contractor shall document the amount and proposed effective date of any general change in the price of materials. Documentation shall be supplied with the contractor's request for increase which will: (1) verify that the requested price increase is general in scope and not applicable just to the Commonwealth of Virginia; and (2) verify the amount or percentage of increase which is being passed on to the contractor by the contractor's suppliers.

The purchasing office will notify the using agencies and contractor in writing of the effective date of any increase which it approves. However, the contractor shall fill all purchase orders received prior to the effective date of the price adjustment at the old contract prices. The contractor is further advised that decreases which affect the cost of materials are required to be communicated immediately to the purchasing office.

- Q. PRODUCT INFORMATION: The bidder shall clearly and specifically identify the product being offered and enclose complete and detailed descriptive literature, catalog cuts and specifications with the bid/proposal to enable the Commonwealth to determine if the product offered meets the requirements of the solicitation. Failure to do so may cause the bid/proposal to be considered nonresponsive.
- R. QUANTITIES: Quantities set forth in this solicitation are estimates only, and the

contractor shall supply at bid prices actual quantities as ordered, regardless of whether such total quantities are more or less than those shown.

- S. RENEWAL OF CONTRACT: This contract may be renewed by the Commonwealth for four (4) successive one year periods, under the terms and conditions of the original contract except as stated in 1. and 2. below. Price increases may be negotiated only at the time of renewal. Written notice of the Commonwealth's intention to renew shall be given approximately 90 days prior to the expiration date of each contract period.

1. If the Commonwealth elects to exercise the option to renew the contract for an additional one-year period, the contract price(s) for the additional one year shall not exceed the contract price(s) of the original contract increased/decreased by more than the percentage increase/decrease of the Transportation Service category of the CPI-W section of the Consumer Price Index of the United States Bureau of Labor Statistics for the latest twelve months for which statistics are available.

2. If during any subsequent renewal periods, the Commonwealth elects to exercise the option to renew the contract, the contract price(s) for the subsequent renewal period shall not exceed the contract price(s) of the previous renewal period increased/decreased by more than the percentage increase/decrease of the Transportation Services category of the CPI-W section of the Consumer Price Index of the United States Bureau of Labor Statistics for the latest twelve months for which statistics are available.

- T. SUBCONTRACTS: No portion of the work shall be subcontracted without prior written consent of the purchasing agency. In the event that the contractor desires to subcontract some part of the work specified herein, the contractor shall furnish the purchasing agency the names, qualifications and experience of their proposed subcontractors. The contractor shall, however, remain fully liable and responsible for the work to be done by its subcontractor(s) and shall assure compliance with all requirements of the contract.

- U. WARRANTY: All materials and equipment shall be fully guaranteed against defects in material and workmanship for a period of 1 year following date of delivery. Should any defect be noted by the owner, the Purchasing Office will notify the contractor of such defect or non-conformance. Notification will state either (1) that the contractor shall replace or correct, or (2) the owner does not require replacement or correction, but an equitable adjustment to the contract price will be negotiated. If the contractor is required to correct or replace, it shall be at no cost to the Commonwealth and shall be subject to all provisions of this clause to the same extent as materials initially delivered. If the contractor fails or refuses to replace or correct the deficiency, the office issuing the purchase order may have the materials corrected or replaced with similar items and charge the contractor the costs occasioned thereby or obtain an equitable adjustment in the contract price.

- V. CONTRACTOR'S REPORT OF SALES: Contractor must report the quarterly dollar value, in U.S. dollars and rounded to the nearest whole dollar, of all invoiced sales under this Contract by calendar quarter; i.e., January through

March, April through June, July through September, and October through December. The dollar value of an invoiced sale is the price paid by the user for products and services on a Contract order as recorded by the Contractor. Contractor shall provide this report to the DGS Contracting Officer, both within 30 days after the end of each quarterly reporting period as defined herein. The report must show each individual item and quantities purchased and the purchaser, and other details as may be requested by the Commonwealth. The report is required to be in electronic MS Excel spreadsheet format (.xls). The Contractor shall provide other reports pertaining to the contract as may be required by the Commonwealth.

- IX. **METHOD OF PAYMENT:** The required payment due date is established by the terms of the contract; or thirty calendar days after the receipt of a proper invoice, or thirty days after the receipt of goods or services, whichever is later.
- X. **PRE-BID CONFERENCE:** There will be an optional pre-bid conference on Tuesday, October 12, 2010, **at 10:00 a.m., at the** Virginia, Department of General Services, Division of Purchases and Supply, Bid Tabulation Room, located on the 1st floor at 1111 East Broad Street, Richmond, VA 23219

Please allow time for parking and sign in at the Security desk. The conference will start **promptly at 10:00 a.m.** The purpose of this conference is to allow potential bidders an opportunity to present questions and obtain clarification relative to any facet of this solicitation. Visitors must check in at the Main Street security desk, present a photo ID, and be escorted to the meeting.

While attendance at this conference will not be a prerequisite to submitting a bid, bidders who intend to submit a bid package are encouraged to attend. Bring a copy of the solicitation with you. Any changes resulting from this conference will be issued in a written addendum to the solicitation.

- XI. **PRICING SCHEDULE (PRICE BID):** The Price Bid shall be filled out in **Attachment "A"**. Bidder's instructions can be found under V. 3.

ATTACHMENT B
TECHNICAL SPECIFICATIONS
Lot I
Type I and Type II Low Floor Transit Buses

Specification	Description	Does your bid comply?	
Reference		YES	NO
Explain			
<p style="text-align: center;">FOR 30' 35' 40' LOW FLOOR BUSES TYPE I TECHNICAL SPECIFICATIONS 1.0</p>	<p>This specification is for 2010 or current year model, Low Floor Bus. The specifications are written to meet the needs of the Commonwealth of Virginia and the Department of Rail and Public Transportation and its' customers; however, the contract resulting from this bid will be made available for use by all state agencies, institutions of higher education, public bodies and other entities authorized to use the contract by the Code of Virginia or any other entities as mutually agreed to by all parties.</p> <p><u>It shall have a minimum expected life of 12 years or 500,000 miles, whichever comes first, and is intended for the widest possible spectrum of adult, passengers, elderly, and persons with disabilities. This includes following all federal requirements and conditions as indicated in Attachment E number 5, but not limited; to all numbers under the conditions.</u></p> <p>The requirements below are for the base vehicle. All components, unless otherwise required by these specifications, shall be the standard or optional equipment specifically advertised and installed by the manufacturer for the vehicle which the bidder proposes to furnish. The only source of information in determining whether or not the equipment is specifically advertised for the vehicle being offered shall be the manufacturer's published vehicle literature.</p> <p>Any equipment called for in these specifications which is not listed by the manufacturer as standard or optional for the model being offered is subject to buyer approval.</p> <p>NOTE: Not all equipment required by this specification is factory installed. Certain items are not available from the Manufacturer. It is your responsibility to review the specifications in detail to insure that you have outside sources of supply where necessary and the capability to fulfill the dealer installation for these items.</p> <p>Vehicles and equipment must conform to the requirements set forth below. Minimum requirements are stated for certain equipment and may be exceeded, subject to buyer approval.</p> <p>These specifications incorporate where appropriate all provisions of the Americans with Disabilities Act Final Rule as stated in the Federal Register Vol. 56, No. 173 of September 6, 1991, Subpart B-Buses, Vans and Systems, pages 45756 through 45761. The minimum specifications for a raised roof van with rear loading lift are as follows:</p>		

ATTACHMENT B
TECHNICAL SPECIFICATIONS

Lot I

Type I and Type II Low Floor Transit Buses

<p>1.1 GENERAL Technical Specifications</p>	<p>These Technical Specifications cover requirements for Low Floor Heavy Duty Diesel Transit coaches which may be used for rural and urban transit service operations on urban streets and rural roadways in the general environmental and climatic conditions prevailing throughout COMMONWEALTH OF VIRGINIA operating area. It is intended for the widest possible spectrum of adult passengers, elderly, and the handicapped.</p> <p>It is the intent of this specification to describe the design requirements for a Heavy Duty Diesel Transit coach rugged enough to withstand rigorous intensive daily transit service operations and provide maximum reliability and availability, with a minimum of maintenance and repair time. The coach shall exhibit maximum passenger appeal in appearance, comfort and safety, combined with excellence in reliability, operating characteristics, efficiency, and economy of operation.</p> <p>The coach shall be fully compliant with the applicable requirements of the Americans with Disabilities Act (ADA) and any revisions published by the Architectural and Transportation Barriers Compliance Board or The Federal Transit Administration for fixed route operations. Where these specifications exceed the requirements of ADA, the specification requirement shall apply.</p> <p>Included in this specification is the description for low floor 30, 35, and 40 foot heavy-duty transit coaches. It shall have a minimum expected life of 12 years or 500,000 miles, whichever comes first, and is intended for the widest possible spectrum of adult passengers, elderly, and persons with disabilities. All vehicles in this procurement shall be of the low floor design with front door wheelchair ramp systems.</p>		
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Low Floor Coach:	
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	40 feet	35 feet	30 feet
Length:	40 feet	35 feet	30 feet
Width:	102 inches	102 inches	102 inches
Height:	114.5 inches	114.5 inches	113.5 inches
Seating Capacity:	39	32	26
Floor Height:	15.75 inches	15.75 inches	15.75 inches
Front Step Height:	15 inches	15 inches	15 inches
Head Room Maximum:	95 inches	95 inches	95 inches
Aisle Width Minimum:	25 inches	25 inches	26 inches
Wheel Base:	284 inches	235 inches	162.5 inches
Turning Radius (front body corner) maximum:	40.5 feet	36.10 feet	29.9 feet
Approach Angle:	9 degrees	9 degrees	9 degrees
Departure Angle:	9 degrees	9 degrees	9 degrees
Curb Weight Max. GVW:	29,000 lbs	27,000 lbs	21,980 lbs
Vehicle Weight Max. GVWR:	39,600 lbs	39,600 lbs	31,000 lbs

ATTACHMENT B
TECHNICAL SPECIFICATIONS

Lot I

Type I and Type II Low Floor Transit Buses

<p>1.2 REQUIREMENTS</p>	<p>a. Coaches are to be used in urban areas, but at the same time must be able to maintain speeds up to 65 MPH for relatively long distances between stops. Coaches shall be able to maintain a minimum of 7 MPH on a fifteen percent (15%) grade when loaded to GVWR.</p> <p>b. Coaches shall incorporate features essential for safe, fast, efficient and comfortable operation by the operator, features that ensure excellent road and traffic visibility under all driving conditions and adequate means for safe passenger movement. The coach shall be made capable of easy maneuvering in normal and heavy traffic.</p>		
<p>1.3 MAINTENANCE AND INSPECTION</p>	<p>Scheduled maintenance tasks shall be related and shall be grouped in maximum mileage intervals. Routine scheduled maintenance actions, such as filter replacement and adjustments, shall not be required at intervals of less than 6,000 miles, except for routine daily service performed during the fueling operations. Higher levels of scheduled maintenance tasks shall occur at even multiples of mileages for lower level tasks.</p>		
<p>1.4 OPERATING ENVIRONMENT</p>	<p>The coach shall achieve normal operation in the environmental conditions normally occurring in the area in which COMMONWEALTH OF VIRGINIA is located in temperature ranges of -10° F to 120° F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 5,000 feet above sea level.</p>		
<p>1.5 CONFORMITY</p>	<p>a. All bidders must conform to these specifications and the product they furnish shall be of first-class quality and the workmanship shall be the best obtainable in various trades. The design of the body, chassis and equipment which the manufacturer proposes to furnish shall be such as to produce a coach of substantial and durable construction in all respects.</p> <p>b. No advantage shall be taken by the manufacturer in the omission of any part or detail which goes to make the coach complete and ready for service, even though such parts or detail are not mentioned in these specifications.</p> <p>c. All units or parts not specified shall be manufacturer's standard units. In all cases, material must be furnished as specified, but if the term, "approved equal" is used, COMMONWEALTH OF VIRGINIA must approve any material or equipment substitute for specified material or equipment.</p>		

ATTACHMENT B
TECHNICAL SPECIFICATIONS

Lot I

Type I and Type II Low Floor Transit Buses

<p>1.6 RESPONSIBILITY</p>	<p>Coach manufacturer shall assume responsibility for all material and accessories in the coach, whether the same are made by coach manufacturer or purchased ready-made from an outside source.</p> <p><u>General Testing</u></p> <p>a. The vehicle provided shall be fully Altoona tested to assure compliance with the performance and safety requirements of the specifications. At the option of COMMONWEALTH OF VIRGINIA, Bidder and/or CONTRACTOR may be required to provide test results and/or certifications insuring compliance with the requirements of the specifications. Certifications or written documentation outlining test procedures and results shall be prepared by a Professional Engineer and/or test laboratory certifying compliance with the requirements of the appropriate section of the technical specification and shall be provided by the Bidder and/or CONTRACTOR for approval by COMMONWEALTH OF VIRGINIA.</p> <p>b. CONTRACTOR may be required to demonstrate compliance with any of the performance requirements of the technical specifications. Minimum testing that shall be required includes;</p> <ul style="list-style-type: none">• Cooling System Performance• AC Performance• Acceleration• Gradability• Internal Noise• External Noise• Passenger Door(s) Opening and Closing Speeds• Lighting Levels• Turning Radius• Water Test		
<p>1.7 INTERNAL NOISE</p>	<p>a. Maximum internal noise shall not exceed eighty (80) DBA in areas "1", "2", and "3", and no more than eighty-three (83) DBA in area "4" as described below. Sound levels within the coach shall be measured with all doors and windows closed and all vehicle equipment operating. If some equipment operates on a cyclic basis, the sound level shall be measured with all equipment functioning simultaneously to determine the worst case noise level.</p>		

ATTACHMENT B
TECHNICAL SPECIFICATIONS

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Type I and Type II Low Floor Transit Buses

	<ul style="list-style-type: none"> b. Measurements shall be made with the vehicle empty, except for test personnel and equipment. Not more than three (3) persons shall occupy the vehicle during the measurements. c. Measurements shall be made at a height of four feet (4') above the floor and directly above the center line of the seats at the following locations: <ul style="list-style-type: none"> 1. The operator's seat; 2. The foremost passenger seat at the centerline of the coach; 3. The seat nearest the center of the coach, and at the coach centerline; and 4. The rear-most seat at the centerline of the coach. d. Accelerate the coach at full throttle from standstill to automatic transmission shift speed. Gear or range must be selected so that terminating test speed is sixty-five (65) miles per hour. Observe and record maximum sound level during this operating mode. The sound level recorded shall be the average of at least four (4) readings. e. Measurements shall be taken where there is no reflecting or absorbing surfaces to change the sounds emitting from the vehicle. 		
<p>1.8 EXTERNAL NOISE</p>	<p>Airborne noise generated by the coach and measured from either side shall not exceed 83 DBA under full power acceleration when operated at or below 35 mph at curb weight and just prior to transmission up shift. The maximum noise level generated by the coach pulling away from a stop at full power shall not exceed 83 DBA. The coach generated noise at curb idle shall not exceed 65 DBA. If the noise contains an audible discrete frequency, a penalty of 5 DBA shall be added to the sound level measured. All noise readings shall be taken 50 feet from the perpendicular to the centerline of the coach with all accessories operating. Instrumentation, test sites, and other general requirements shall be in accordance with SAE Standard J366. The pull-away test shall begin with the front bumper even with the microphone. The curb idle test shall be conducted with the rear bumper even with the microphone.</p>		

ATTACHMENT B
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<p>1.9 CRASHWORTHINESS</p>	<ul style="list-style-type: none">a. The coach body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a 6 inch reduction in any interior dimension. Windows shall remain in place and shall not open under such a load.b. The coach shall withstand a 25 mph impact by a 4,000 pound post-1973 American automobile at any point, excluding doorways, along either side of the coach with no more than 3 inches of permanent structural deformation at seated passenger hip height. This impact shall not result in sharp edges or protrusions in the coach interior.c. Exterior panels below the rub rail and their supporting members shall withstand a static load of 2,000 pounds applied perpendicular to the coach anywhere below the rub rail (on standard floor coach only) by a pad no larger than 5 inches square. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the coach.d. The coach, at GVWR and under static conditions, shall not exhibit deformation or deflection that impairs operation of doors, windows, or other mechanical elements. Static conditions include the vehicle at rest with any one wheel or dual set of wheels on a 6 inch curb or in a 6 inch deep hole.e. All structure, body, and panel-bending mode frequencies, including vertical, lateral, and torsion modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible, or sensible resonant vibrations during normal service.f. The standard floor bus rub rails shall be capable of withstanding impacts of 200 foot pounds of energy from a steel faced spherical missile no less than 9 inches in diameter and of a 500 pound load applied anywhere along their length by a rigid plate 1 foot in length, wider than the rub rail and with 1 inch end radii with no visible damage to the rub rail, retainer, or supporting structure. A damaged portion of the rub rail shall be replaceable without requiring removal or replacement of the entire rub rail. The low floor bus does not require rub rails.g. To protect passengers seated in low floor area, the basic low floor coach structure shall incorporate a substantial side impact barrier. The barrier shall include steel plate, continuous between the front wheel arches and the rear		
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	<p>suspension (except in the width of the exit door opening).</p> <p>h. The impact barrier shall be an integral welded part of the undercarriage portion of the coach structure, and shall be angled such that vehicles impacting the coach side will tend to subvert.</p> <p>i. To further increase both passenger safety and reparability, robust welded structures are required between the angled barrier and the coach side skins. These shall be designed to dissipate collision energy.</p>		
<p>1.10 MATERIAL</p>	<p>a. All materials used in construction of the coach and all its parts shall conform in all respects to American Society of Testing Materials, Society of Automotive Engineers, or similar association standards. Materials used shall be exact duplicate in manufacture, design and construction on each coach model.</p> <p>b. Reinforced fiberglass and plastic materials shall be excluded from the basic body construction, except for replaceable panels, doors, and front and rear caps.</p> <p>c. All lumber shall be thoroughly kiln dried free from knots and checks and shall be of clear straight grain, dressed on all sides.</p> <p>d. All painted aluminum sheets shall be thoroughly cleaned and coated on the outside with PPG DPU Low VOC primer, or approved equal, prior to assembly in coach.</p> <p>e. All joints shall be protected by application of PPG DPU Low VOC primer, Butyl Tape Sealer, or approved equal, at assembly.</p> <p>f. Plywood shall be of a marine grade with sealed waterproof edges.</p> <p>g. All bolts, nuts, washers and exposed linkage shall be zinc, cadmium plated or phosphate coated to prevent corrosion.</p> <p>h. All bolts, nuts, and washers shall be SAE Grade 5.</p>		
<p>1.11 CORROSION</p>	<p>a. The vehicle shall resist corrosion from atmospheric conditions and road salts. It shall maintain structural integrity and maintain original appearance throughout</p>		

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	<p>its service life, provided it is maintained in accordance with the procedures specified in the manufacturer's service manual by COMMONWEALTH OF VIRGINIA. Materials exposed to the elements and all joints and connections of dissimilar metals (and remote from each other in the galvanic series), shall be corrosion-resistant and shall be protected from galvanic corrosion.</p> <p>b. The entire body frame assembly, access doors, fenders, cab, underbody, wheel housings, lower skirt panels, including closed-off body panel sections, the interior of tubing structure and all welds shall be treated and rust-proofed with a commercial grade heavy-duty rust-proofing material. All metal body parts shall be given a thorough multiple-stage anti-corrosion treatment. The product used shall be listed as a qualified product under Mil Spec C-62218, Mil Spec C-0083933A (MR). Zinc chromate or zinc phosphate prime paint shall be applied to both aluminum and steel. Body panels that are one-side galvanized, two-side galvanized, two-side iron-zinc alloy, zincrometal, aluminum or tin coated, etc., or treated in any other method or procedure currently accepted by the commercial vehicle industry, are acknowledged as meeting this requirement and need no further treatment, except for finish prime/paint or undercoating where applicable. Representative samples shall withstand a 2-week salt spray test in accordance with ASTM Procedure B-117 with no visual or structural detrimental effects to normally visible surfaces, and any significant structural degradation or weight loss of over 1 percent for other members or components.</p>		
<p>1.12 UNDERCOATING</p>	<p>a. Except as noted below, the entire body lower frame assembly, cab, underbody, understructure/frame, chassis, fenders, wheelhousings, and lower skirt panels shall be completely undercoated.</p> <p>b. Undercoating shall be PPG Corashield 7972 material. Undercoating shall be applied to a uniform thickness throughout with no bare spots.</p> <p>c. Items and components that shall not be undercoated include non-metallic fender and engine, transmission, driveshaft(s), differential/axle housing, brakes, lube fittings, exhaust system, and power steering.</p>		

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<p>1.13 AXLES</p>	<p>Both front and rear axles shall have the load rating for the gross loads equal to or greater than the coach builder requires them to carry. The gross load shall include curb weight plus seated and one standee per row passenger seat with the average weight of each passenger to be 150 pounds. Front and rear axles for the coaches shall have the highest GVWR capacity available. <u>Front and rear hubs shall be of steel construction.</u></p> <p><u>Front Axle</u></p> <p><u>Type</u></p> <ul style="list-style-type: none">a. Front axle shall be designed with proper wheel and axle geometry so that imperfect front axle operation will not be encountered in service.b. Front axle shall be 14,600 lbs., minimum rating.c. For 30' low floor coach, axle shall be 10,000 lbs., minimum rating.d. Wheel bearings shall utilize "wet" lubrication or grease <p><u>Rear Axle</u></p> <p><u>Type</u></p> <ul style="list-style-type: none">a. Rear axle shall have minimum rated capacity of 26,000 lbs.b. For 30' low floor coach, axle shall be 21,000 lbs., minimum rating.c. The rear axle shall be a heavy-duty, full floating type, Meritor Standard, or approved equal, incorporating a spiral bevel drive. The axle housing shall be a steel stamping and located to the roadside of the axle center. End tubes shall be removable and shall be threaded to allow for adjustment of wheel bearing nuts. The housing drain plug shall be magnetic.d. The differential carrier shall incorporate the differential assembly, drive pinion and pinion cage. Carrier shall be removable as a complete unit from the axle housing.e. The four (4) pinion differential gears shall be carried in a two-piece case mounted on tapered roller bearings. Torque nuts and bolts are used to mount the dowel		
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	<p>gear drive to the flanged half of the differential case.</p> <p>f. Axle shafts shall be the floating type with all wheel bearing loads carried on the axle housing end sleeves.</p> <p>g. The drive flanges at the outer end shall be attached to hub-piloted wheels.</p> <p>h. Wheel bearings shall utilize "wet" lubrication.</p> <p><u>Rear Axle Gear Ratio</u></p> <p>The differential gear ratio is subject to approval by USER prior to production after reviewing performance computer generated models.</p>		
<p>1.14 BRAKES</p>	<p><u>General</u></p> <p>Each coach must be equipped with both service and emergency brakes.</p> <p><u>Brake Chambers</u></p> <p>Brake chambers shall be Anchorlok or MGM type 30 with protective boot over the push rod, or approved equal.</p> <p>Brake chambers shall be equipped with manufacturer's standard diaphragm and spring. Brake system shall be balanced to provide safe stop operation.</p> <p><u>Service Brakes</u></p> <p>a. Coaches shall be equipped with brake systems which conform to the requirements of all Federal and State regulations, designed so such conformance can be maintained throughout the normal adjustment cycle. A supplemental brake (transmission retarder) shall also be provided. The supplemental braking shall not be used in meeting regulatory criteria. The braking system shall include service brakes, a parking and emergency brake.</p> <p>b. Service air brakes shall be furnished on all wheels of each coach.</p> <p>c. <u>Control</u> - The driver's brake pedal shall control the service brake and the supplemental brake in a coordinated manner to give a total braking effort depending on the position of the pedal up to the maximum capability of the</p>		

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braking system. The control shall make maximum practical use of the supplemental brake to minimize brake fade and to achieve maximum brake lining lifetimes. Braking forces shall be proportioned among the axles to assure balanced braking and equalize lining life between axles. Braking shall be initiated at the second axle.

- d. Brake lights shall be activated as soon as the brake pedal is depressed only.
- e. Brake Drums, Shoes and Linings - Rear brake drums shall be a minimum of 14.5 by 10 inches (368 by 254 mm). Front brake drums shall be a minimum of 14.5 by 6 inches (368 by 152 mm). Brake shoes shall be of two shoe type, heavy duty, and fabricated steel, heavily ribbed to insure uniform pressure. Linings shall be non-asbestos. A method of visually indicating wear of the brake lining shall be provided. 'S'-cam brakes shall be supplied. Drums shall be labeled with the maximum safe diameter for drum refinishing. Other brake configurations, such as disc brakes may be supplied with the prior approval
- f. Brake Adjustment - Brakes shall be provided with "Haldex" or approved equal automatic slack adjusters. All slack adjusters shall be removable without disassembly or removal of other components. Slack adjuster travel and geometry shall be designed not to exceed 90 degrees in relation to the pushrod, when properly adjusted, throughout the lining life.
- g. Brake Hoses - Brake hoses shall be installed in locations where the possibility of damage is minimized. Hoses shall be clamped and supported by the coach structure to minimize long unsupported hose lengths and to eliminate rubbing and/or chafing.

Emergency Brake

Coach shall be equipped with spring brakes Anchorlok #3030 or MGM #E3030T, with quick release yoke or manual "wind-off", or approved equal, capable of bringing the coach to a stop from a speed of twenty (20) miles per hour at a deceleration rate equivalent to a stop within sixty feet (60') with a seated passenger load. Brake valve to be PP-1 40 PSI setting.

Slack Adjusters

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	<p>Automatic slack adjusters, as manufactured by Haldex, or approved equal, shall be furnished on front and rear brakes. Adjusting bolt and lock shall be positioned so adjustment can be made easily.</p> <p><u>Brake Retarder</u></p> <ul style="list-style-type: none">a. Transmission shall have an integral brake retarder. (Activated from brake application not accelerator)b. Retarder ON-OFF Toggle switch shall be mounted inside the electrical junction box above the driver or approved by the purchaser.		
<p>1.15 AIR SYSTEM</p>	<p><u>Air Compressor</u></p> <ul style="list-style-type: none">a. Air compressor shall be a Bendix-Westinghouse TU-Flo 750, or approved equal, with capacity of 15.5 cfm minimum.b. Compressor shall be gear driven by the engine. <p><u>Air Governor</u></p> <p>Air Governor shall be Bendix-Westinghouse "D-2" type, or approved equal.</p> <p><u>Air Tanks</u></p> <p>Air reservoirs shall be of adequate capacity for supplying the air volume needs of the coach. First tank shall be equipped with a Bendix #800691 PUROGUARD System filter and an automatic air dryer Sludge Breaker QBA15, or approved equal, and shall operate in conjunction with the air governor or relay valve. All air tanks shall be equipped with drain valves.</p> <ul style="list-style-type: none">a. There shall be low-air pressure switches located on the air tanks. They shall monitor the primary and secondary reservoir air pressure.b. In combination with the visual and audible signals, there shall be single, dual needle air pressure gauge reading the pressures of the primary (rear brake) and secondary (front brake) reservoirs. <p><u>Brake Lines Body Mounted</u></p>		

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| | <ul style="list-style-type: none">a. All air lines shall be synflex nylon tubing, color coded or approved equal. Lines shall be securely mounted to frame to prevent chafing or wear. Clamps shall be of proper size. Lines shall be protected at clamps with heat resistant material.b. The main air line between the air compressor and first air tank shall be minimum three-fourths inch (3/4") I.D.c. Rubber grommets shall be used at all points where air lines pass through bulkheads or any supports.d. All air lines shall be protected to prevent freezing in cold weather.e. All clamps, fittings, etc., must be easily accessible and installed in such a manner that they are easily removed and replaced. | | |
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Brake Lines at Wheel

Flexible brake lines shall be Parker 293, with nut and sleeve type fittings. They shall be of adequate length to prevent any strain, regardless of relative motion between brake valve and brake chamber, without allowing chafing or rubbing.

Brake Relay Valve

A brake relay valve shall be provided. It shall be Bendix-Westinghouse R-12, or approved equal.

Check Valve

A check valve shall be provided between #1 and #2 tanks, adjacent to the second tank, and accessible for service.

Discharge Line

Discharge line to first tank shall be #12, three-fourths inch (3/4") O.D. Teflon hose with braided stainless steel jacket and shall be properly supported every two feet to prevent chafing or damage and so assembled that the line will be free of sharp bends, and will drain all moisture into the reservoir. Discharge line on the low floor bus shall be a #16 hose.

Emergency Brake Control Valve

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	<p>The control valve shall be located to the left and adjacent to the driver for safe, convenient access. The valve shall be a Bendix Westinghouse type PP1, with 40 PSI setting, or approved equal.</p> <p><u>Interlock Valves, Door, Accelerator and Brake</u></p> <p>Door, accelerator and rear brake interlock valves shall be mounted to minimize length of air lines.</p> <p><u>Towing-Air Line Connector</u></p> <p>An air line connector (Shrader or approved equal) shall be installed on the front end of the coach.</p> <p><u>Switch, Low Air Pressure</u></p> <p>The switches shall be connected in parallel and shall trigger a red indicator "LOW AIR" light and an audible alarm when the air pressure of any reservoir is below 90 p.s.i.</p>		
<p>1.16 COOLING</p>	<p><u>Radiator</u></p> <p>The radiator shall be of durable corrosion resistant construction with bolted-on removable stainless steel tanks. Radiator core shall be copper dimple type clog resistant. Radiator piping shall be stainless steel or brass tubing, and, if practicable, rubber hoses shall be eliminated. Necessary hoses shall be premium silicone rubber types that are impervious to all coach fluids.</p> <p><u>Filler Neck and Cap</u></p> <ol style="list-style-type: none"> a. The sealed cooling system shall be provided with self-unloading valve to prevent extreme pressure from injuring cooling system. b. A manual pressure release valve shall also be provided. <p><u>Surge Tank</u></p> <p>Heavy-duty copper, brass (stress relieved), or stainless steel radiator surge tank shall be provided and mounted above the radiator and easily accessible for service. Sight glass shall be provided to allow check of fluid level without opening system. Filler cap shall be hinged type.</p>		

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	<p><u>Water Pump</u></p> <p>Water pump shall have sufficient capacity to prevent any hot spots under all operating conditions.</p> <p><u>Fan and Drive</u></p> <p>A thermostatically controlled fan with six (6) blades shall be provided and shall be effectively power-driven only at engine temperatures in excess of one hundred eighty degrees (180 degrees). The fan is to be mechanically driven.</p> <p><u>Hose</u></p> <p>Engine water and heater hoses shall be premium quality Armet or Flex-Fab silicon hose. All hoses shall be protected from engine heat which may cause premature failure.</p> <p><u>Hose Clamps</u></p> <p>All hose clamps shall have constant tension. Hose clamps shall be 1/2 inch wide minimum, stainless steel worm type, and socket tightened with collar. Breeze or approved equal.</p> <p><u>Coolant</u></p> <p>Coolant shall be LS antifreeze, an ethylene-glycol with rust inhibitor Nal-Cool 3000, or approved equal. Coolant shall be 40% ethylene-glycol.</p>		
<p>1.17 ELECTRICAL</p>	<p><u>Compliance with Regulations</u></p> <p>Turn signals and all interior and exterior lights shall meet all State and Federal requirements.</p> <p><u>Alternator and Regulator</u></p> <p>The alternator shall be sized to supply the entire nighttime operating electrical load of the coach while providing at least 20 percent of its current output for battery charging when the battery is fully discharged. The alternator shall be a Delco 50 DN rated at 300 amps, or approved equal with an external electronic voltage regulator.</p> <p><u>Backup Alarm</u></p>		

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An electrical backup alarm producing an intermittent sound or a buzzer connected with backup lights shall be furnished. It shall be loud enough to be heard when the engine is running.

Battery

The term battery means two or more heavy duty top quality lead acid battery units mounted side by side in a battery compartment. Batteries shall be by "DEKA" or approved equal. The configuration for the battery is two battery units size 8D, 12 volt, 6 cell and 31 plates per cell. These battery units shall measure approximately 19.50 long by 10.75 inches wide by 8.75 inches high (495 by 273 mm by 222 mm high). Battery units shall have polypropylene cases and end-over terminals not exceeding 2 inches (51 mm) out from battery case. For ease in handling, no single battery unit shall exceed 155 pounds (70 kg). Batteries shall be stamped with the date of manufacture. Batteries shall not be abused or quick charged before delivery.

Despite the battery configuration stated above, the Contractor shall be responsible for analysis of the loads and selecting a battery of adequate capacity to supply them.

Battery Terminals/Wiring

The battery wiring shall be terminated with properly sized ring terminals. The cable shall be permanently marked with a "+" and "-" at the battery end. Cables shall be extra flexible and routed in the battery box so as not to chafe or rub on the battery tray and other components. Cable ends shall be sealed to eliminate corrosion from battery acid and/or fumes. Cable ends shall be attached to the battery studs with non corroding flat washers, spring washers and brass nuts. The positive battery terminal shall be a 3/8 NC stud and the negative terminal shall be a 3/8 NC stud. Stud length shall be 1 inch (25 mm) as measured from the terminal face. Cable ends will be coated with a corrosion inhibitor after being attached to the batteries.

Electrical Panel

Circuit breakers shall be provided to sectionalize and protect all branch circuits of the electrical system of each coach.

To the maximum practical extent, electrical distribution and control devices shall be grouped on an electrical panel arranged for ease of access, test, and replacement of

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components. The panel shall be large enough to avoid crowding of the components and leads. Component heat build-up shall not affect the components or mounting locations. There shall be a test plug receptacle for electronically diagnosing the engine using portable instruments.

A durable diagram shall be mounted, in the electrical panel that identifies the components and their function. Relays and circuit breakers shall be permanently labeled to correspond to this diagram. Switch controlled lights shall be provided to illuminate the main electrical panel.

Multi-Plex System Electrical. Dinex-MPX

The main coach controller (MBC/HCNC) shall be located at the rear electrical enclosure panel (rear bulkhead). Additional DIO's (digital Input/Output Module) will be located above the exit door, air tank compartment, driver's console, and in the rear electrical enclosure panel. The indicator lamp strip module shall be integrated into the multiplexing system to receive commands from the master module to turn appropriate indicator lights on and off according to programming commands. The system shall be connected by a "ring loop" hookup.

Electrical Main Switch

An electrical main switch shall be provided to positively disconnect the battery from electrical loads when the coach is not in use or in emergency situations. The switch shall be located in an outside compartment which requires no tool(s) for access. The switch shall be totally sealed in its own sub-compartment. It is preferred that the switch handle be non-removable. If the switch handle is removable, it shall be attached to the switch housing using a small corrosion proof metal cable. Emergency flasher and radio power circuitry

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shall be independent of the main switch.

Main Switch Circuit Breaker

A manually reset circuit breaker capable of interrupting a major short circuit shall be supplied on the positive side of the batteries. The breaker shall be located near the batteries in an easily accessible location, sealed from water and battery fumes.

Battery Jumper Terminals

There shall be a set of battery jumper terminals located next to the battery electrical main switch and a set located in an easily accessible location in the engine compartment. These connectors shall be Anderson Model 350 (Red) or approved equal. The positive terminal shall be red in color and the negative terminal shall be black. The metal housing face where the terminals are attached shall be permanently marked "+" and "-" by etched metal.

Towing Connector

An electrical receptacle shall be provided behind the front bumper of each coach, adjacent to the air connector described elsewhere in this section, to receive power for illuminating the tail lights, stop light and directional signals from a towing vehicle. The receptacle shall be a 7-wire receptacle assembly. "Cole-Hersee" No. 12063 or approved interchangeable equal. The pins shall be coated with corrosion resistant paste. The termination end of the receptacle shall be strain relieved and sealed against water entry.

Fare Equipment Power Supply

If a farebox is not ordered with the bus, Contractor is to supply a coil of 10-gauge 30-amp capacity wire, through floor mounting hole for farebox wiring, powered by a dedicated circuit for later hookup.

Radio Power Supply

A separate electrical circuit, initiated at the batteries and terminating at the radio box shall be supplied. This circuit shall be independent of the electrical main switch, be capable of delivering 25 continuous amperes at 12 volts and be protected at the source with an adequate circuit breaker. No other electrical equipment shall be attached to this circuit. It shall be connected and placed

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minimize electrical noise, hash and transients. If a 24 volt coach electrical system is used for the coach, an "Electric Transit Laboratories Inc. (ETL)" or approved equal converter shall be provided in the radio box to supply 12 volt power to the radio.

Starter

The engine starter shall operate from normal coach voltage and be sized to provide sufficient torque to turn the engine reliably under all hot or cold engine or ambient temperature conditions. The starter shall be a heavy duty "Delco Products Division" Model 42MT or approved equal as recommended by the engine manufacturer.

The starter solenoid switch shall be interlocked so that:

- Engine can be started in neutral gear only with the transmission selector in neutral only and the parking brake applied.
- Starter will not operate when engine is running. The interlock shall be activated by fuel pressure or by other approved means.
- Other major electrical loads shall be disconnected while cranking.

Low Voltage Wiring

All wiring including cables shall be stranded copper, color coded adequate in size to carry the electrical load. Each harness shall contain identified spare wires (10 percent, minimum one) and shall be installed with consideration of possible future need to remove and replace it. All low voltage lighting shall run sufficiently cool as to eliminate any damage to lamps, lenses, and sockets, wiring or surrounding areas. Electrical junction boxes shall have sealed covers and openings.

Insulation

Wiring shall be insulated with two-layer cross-link polyethylene. Insulation must be moisture proof and heat resistant. It shall be design objective to route wiring and harnesses in areas with no temperature build-up. If wiring must be run in areas of heat build-up, it must withstand, without deterioration for the life of the coach, the highest temperature in the area served. Engine compartment wiring shall be heat, oil and flame resistant.

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Voltage Drop

There shall be no more than a 0.5 volt cumulative drop on any circuit, measured from the initiating source to the appliance load positive and from the appliance load negative to the reference ground with the load fully operational.

The initiating source for any 24 volt circuit is defined as the 24 volt output positive post of the series connected batteries.

The initiating source for any 12 volt circuit is defined as the 12 volt output positive post of the battery equalizer/splitter (Vanner).

The reference ground is defined as the most negative post of the series connected batteries.

Protection and Support

Wiring shall be protected from weather and mechanical injury. Cables should be supported along their length and strain-relieved near terminations so that connectors and terminals are not under stress. Wire and cable passing through holes in sheet metal, structural members, etc. shall be protected with a grommet or other approved device. Wire and cable subject to flexing shall be extra flexible and shall be installed to allow for continual flexing without damage to the conductors or insulation. Wiring routed next to or bent over other materials shall be chafe protected by approved means.

All under coach looms, cable runs, connectors, terminations and harnesses should be totally sealed to dirt, water and road hazard. Under coach wiring shall be run in sealed flexible plastic conduit.

Terminations

All electrical connectors shall be replaceable. Engine and transmission harnesses shall have sealed, quick disconnect connectors to facilitate engine and transmission removal. All high current connection points shall be coated with approved conductive coating.

All wire termination loops shall have a minimum of 2 inches (51 mm) excess wire for additional end terminal installation which will allow at least one replacement of the termination without disrupting the wiring harness. Wires shall not be spliced between terminations.

Cable terminations shall be pressure-type terminals applied with

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full cycle correct tool of the same manufacturer as the terminal. terminals shall be full-ring, interlocking or tongue-type sized for terminal screw or stud.

All under coach connectors shall be of a locking type. Use of spade terminals shall be with Authority approval only. Connector terminals shall be coated with approved dielectric grease. Drip loops shall be supplied on all under coach termination points.

All electronics components and boxes shall have quick disconnected plugs attached. Hard wiring to these boxes is prohibited.

Wire Numbering

The conductor identification shall be developed by the Contractor to give an individual identifying designation to each wire for circuit tracing and renewal of equipment and shall be shown on all electrical diagrams. All junction panel terminals shall be numbered.

All wiring shall be identified with hot stamped, machine printed wiring numbers printed on the insulation itself with no more than 6 inches (153 mm) of space between the identifying printed numbers along the continuous run of wire.

Wire markers and/or any type of heat shrink shall not cover any termination point or crimped lug without approval.

Numbers shall not be removable by and be impervious to normal abrasion, oils, diesel, grease, Anti-Freeze and water

Console Assembly and Instrument Panel

- a. Side Console Assembly shall contain the following switches, all of which shall have lighted legends.
 - Master Switch: 4-position rotary switch identified with lighted legend "Engine Stop," "Run," "Night" and "Park" marked on the panel, in accordance with FMVSS requirements.
 - Engine Start: Push-button switch marked "Start."
 - Hazard Warning: 2-position On-Off toggle switch with lighted hazard symbol. Legend to be "Hazard" or symbol.

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	<ul style="list-style-type: none"> • Defroster: 3-position toggle switch having "Low-Off-High" positions. Legend to be "Defroster." • Chime Switch: 2-position toggle switch having "On-Off" positions with legend "Chime." • Farebox Light Switch: 2-position toggle switch having "On-Off" positions with legend "Farebox Light." • Fluorescent Light Switch: 3-position toggle switch having "All-Off-Rear" positions with legend "Interior Lights." • Radio "Emergency Call" switch. No legend allowed. Locate in sidewall panel near driver's left knee position. • Door control handle. • Switch for fan for defrosting the windshield. <p>b. Instrument Panel shall be manufacturer's standard for heavy-duty service, with clear lettering for identification and shall house the following controls:</p> <ul style="list-style-type: none"> • Panel light dimmer: A rotary rheostat, labeled "Panel Lights," which controls the intensity of the panel and legend lights. • Wiper control: An air control for each side, with lighted legend "Wiper," which controls the windshield wipers. • The instrument panel shall contain, at a minimum, the following indicator lights: <table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">Left Turn Signal</td> <td style="width: 50%;">Exit Door</td> </tr> <tr> <td>Open</td> <td></td> </tr> <tr> <td>Right Turn Signal</td> <td>Charging Failure</td> </tr> <tr> <td>Hot Engine</td> <td>Brakes On</td> </tr> <tr> <td>Low Engine Oil Pressure</td> <td>High Beam</td> </tr> <tr> <td>Headlights</td> <td></td> </tr> <tr> <td>Low Air Pressure</td> <td>Door Unlock</td> </tr> <tr> <td>Function</td> <td></td> </tr> <tr> <td>Fire Warning</td> <td>Retarder</td> </tr> <tr> <td>Bike Rack Deployed</td> <td></td> </tr> </table>	Left Turn Signal	Exit Door	Open		Right Turn Signal	Charging Failure	Hot Engine	Brakes On	Low Engine Oil Pressure	High Beam	Headlights		Low Air Pressure	Door Unlock	Function		Fire Warning	Retarder	Bike Rack Deployed			
Left Turn Signal	Exit Door																						
Open																							
Right Turn Signal	Charging Failure																						
Hot Engine	Brakes On																						
Low Engine Oil Pressure	High Beam																						
Headlights																							
Low Air Pressure	Door Unlock																						
Function																							
Fire Warning	Retarder																						
Bike Rack Deployed																							

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- c. Indicator lights shall be arranged across the top of the instrument panel.
- d. Turn signal switches shall be located on the floor near the driver's left foot and shall be constructed with polarized multi-connector plugs.
- e. The instrument panel shall house the following monitor devices:
 - i. A dual-needle gauge that monitors air pressure in the front and rear brake reservoirs.
 - ii. Speedometer: A speedometer with MPH as major markings, 0-80 MPH.

Defroster Fan

A 12V 5-blade fan, with fan guard, shall be located in the lower left corner of the windshield area of the coach. Switch shall be mounted on the driver's console. Fan shall be adjustable to allow fan to blow air toward Bus Operator.

Door Electrical

- a. Rear door shall be passenger actuated, manual.
- b. Locking and unlocking of doors shall be controlled by a door-control handle located on the driver's console. Door control handle, when in the "rear" position, shall energize a solenoid that unlocks the door. A LED green lamp, which indicates that door is operable, shall be located above rear door. A red "EXIT DOOR OPEN" indicator lamp on driver's panel shall illuminate simultaneously with green lamp while door is open. A lamp mounted on the exterior, or door header above the front and the rear doors, shall be illuminated when the door is operable. Front and rear stepwell illumination lamps shall operate the same way. Lamps to be controlled by the master switch in the "Run" or "Night" position.

Engine Compartment and Rear Control Box

- a. The engine compartment shall have a rear control box with engine oil pressure and water temperature gauges.

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	<p>Gauges shall be mechanical.</p> <ul style="list-style-type: none">b. The control box shall be located in the upper right corner of the engine compartment.c. Four (4) 21 c.p. incandescent LED lamps shall be installed in the engine compartment in locations which will provide maximum illumination for the mechanics.d. The engine and coach control switches on the face of the panel shall be as follows:<ul style="list-style-type: none">i. Starter Switch - Three position toggle switch, marked "Front-Off-Rear" for selection of engine start position. Must be weatherproof.ii. Light Switch - Two position toggle switch marked "Engine Compartment Lights." Must be weatherproof.iii. Engine Start - Push button switch marked "Start," with waterproof rubber cover, shall operate the starter motor only when the starter switch is in the "Rear" position and transmission is in neutral. The engine transmission down link port shall be provided. Throttle control must be variable speed. <p><u>Horn</u></p> <p>Dual electric horns mounted so as to be protected from road splash. Control shall be push button, located in center of steering wheel.</p> <p><u>Exterior Lighting</u></p> <ul style="list-style-type: none">a. Exterior lighting shall conform to FMVSS requirements.b. Headlamps shall be guide lamp, rectangular sealed beam, dual, 12 volt Halogen H50 54. Headlights shall be switched on with ignition switch. A dimmer switch shall be mounted on the floor between and above the turn signal switches. The instrument panel shall have a high beam indicator lamp. Vehicles shall be equipped with daytime running headlamps.c. Clearance, Marker and I.D. Lights. All clearance and I.D. lights shall be Dialight surface or flush mount LED type. The units shall protrude not more than 1.5 inches when mounted on the vehicle. If a surface mount marker		
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design is used, a custom guard to prevent damage to the light during contact shall protect the marker. All electrical connections to the LED light shall be by wire coming from the light housing and terminated with a Packard Weather Pak connector. No interim connector shall be allowed on the body of the light. All lenses shall be smooth to prevent dirt entrapment and ease the washing process.

- d. Front directional signals shall have amber lenses and shall be located on the right and left front corner areas of the coach.
- e. Rear, tail, stop, backup and turn signal lamps shall be mounted on the right and left rear corner areas of the coach.
 - i. A Third LED high mount brake light bar will be included.
 - ii. Top and third lamps (stop and tail) shall be red Dialight Series 40, or approved equal. LED tail lights shall be fabricated with the use of a current regulator circuit to the LED's that allow for the operation of the device from 7 volts to 16 volts with constant intensity. All electrical connections to the LED light shall be by wire coming from the light housing and terminated with a Packard Weather Pak connector. No interim connector shall be allowed on the body of the light. All lenses shall be smooth to prevent dirt entrapment and ease the washing process. The entire LED assembly shall be specially coated to protect the light from chemical and abrasion degradation.

Flange Mounted 4" Round

In addition to the above, if flange mounted 4" round lamps are used, the flange shall be constructed in a manner that water intrusion will not be allowed between the lighted portions of the lamp flange.

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	<ul style="list-style-type: none">iii. Middle lamp (turn) shall be amber Dialight Series 40, or approved equal. The turn lights shall be fabricated with the use of a current regulator circuit to the LED's that allow for the operation of the device from 7 volts to 16 volts with constant intensity. All electrical connections to the LED light shall be by wire coming from the light housing and terminated with a Packard Weather Pak connector. No interim connector shall be allowed on the body of the light. All lenses shall be smooth to prevent dirt entrapment and ease the washing process. The entire LED assembly shall be specially coated to protect the light from chemical and abrasion degradation. iv. Bottom lamp (back-up lamp) shall be Grote No. C458, Weldon 3-2035-1100, or approved equal, with removable acrylic clear lens, replaceable 32 c.p. bulb numbers 1156, or approved equal. Shall be LED is available f. Side turn signal lamps shall be located on each side of the coach at the forward edge of the front wheel housing. The side signal lights shall be Dialight amber 18 Series lights. These lights shall be guarded for protection. The light shall be visible from the rear and front of the coach as well as outward. All electrical connections to the LED light shall be by wire coming from the light housing and terminated with a Packard Weather Pak connector. No interim connector shall be allowed on the body of the light. The same type side signal lamp shall be located slightly above and slightly forward of the rear wheel housing. g. Intermediate side marker lights shall be Dialight LED Series 84, or approved equal, one on each side of coach. h. License plate lamp shall be Arrow Safety Devices #437, K/D lamp #260-2388, or approved equal, with replaceable 4 c.p. bulbs #67, recessed in right lower quadrant of the engine compartment door. i. Curb lamps shall be positioned in manufacturer's standard location above the front and rear doors in such a manner as to illuminate the ground area in the immediate vicinity of the stepwell. Lamps shall be actuated when entrance door, exit door, or both, are opened. j. Directional lamps shall be equipped for simultaneous		
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flashing for emergency use.

Interior Lighting

- a. Front stepwell shall be lighted by stepwell light, suitably mounted, so that entire stepwell and a portion of the ground area immediately outside the coach are illuminated.

- b. An overhead fluorescent lighting system, Transmatic or approved equal, shall provide general illumination in the passenger compartment and shall be controlled independent of the run switch. The system shall provide a minimum of 25 foot-candles of luminance on a one square foot plane, centered 33 inches above the floor and 24 inches in front of the seat back at each seating position. The floor surface in the vestibule shall be illuminated at a minimum of 4 foot-candles with the front door open and a minimum of 2 foot-candles with the front door closed. Power consumption from the lamps shall not exceed 9.5 watts per linear foot of fixture length. Fluorescent light fixtures shall be located above the side windows at or near the juncture of the coach ceiling and the side wall and may be provided over the rear door. The fixture lenses shall have a cover with louvers or baffles to reduce glare in the windshield which affects driver visibility. Advertising media located in this area shall be illuminated by direct lighting, although the interior lighting requirements shall be attained without advertising media installed. The lighting system materials shall comply with the Federal Transit Administration Docket 90-A Specification.

- c. Interior advertisement racks shall be reinforced by use of structural members attached directly to the coach structure. The advertisement racks shall be hinged to provide access to the air plenum at every fixture location without removing the fixture from the coach structure. The card racks shall be retained in the closed position by use of threaded closing screws. The card racks shall be self-retained in the open position to allow maintenance accessibility. The fixture shall be enclosed to inhibit the accumulation of dust and insects. The fixture lens cover shall be hinged to provide access to the fluorescent lamps, ballast and wiring interconnects, without removing the fixture from the coach structure. The lens cover shall be retained in the closed position by use of threaded closing screws. The fluorescent lamp ballast shall be a direct plug-in type, with integral electrical connector, and no exposed wires. The ballast shall be accessible without removing the lamps. The fluorescent lamps shall be the bi-pin type and shall be

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	<p>supported around the lamp base, not exclusively by the lamp pins. Wiring to the input connector and to the lamps shall be continuous, without splices or secondary connections. The wiring to the lamps shall be contained in a wiring trough. Interchangeability of lamps, lenses fixtures, and power supplies shall be maximized.</p> <p>d. The fluorescent lights shall be powered by a DC power supply. The ballast shall be an unspotted and repairable unit. The ballast shall meet FCC Part 18 Class A regulation for EMI conducted and radiated emissions. The ballast shall contain reverse polarity protection. A green LED indicator shall be provided for output verification which shall be viewable with the lens cover in the open position. The ballast shall contain a case mounted fuse for current overload along with proper thermal protection. The ballast shall be warranted for five years of normal use without failure. Each ballast shall power two (2) fluorescent tubes.</p> <p>e. Lighting intensity for all cross seats, forward of the rear longitudinal seats, shall have a minimum average of fifteen (15) foot candles, with a minimum of twelve (12) foot candles at the seated passenger reading plane, that plane being thirty-three inches (33") above the floor on a forty-five (45) degree angle. An effective level of lighting shall also be provided for all other seated passengers.</p> <p>f. The lighting components shall be so located and constructed to prevent the entrance of water, contaminants and insects.</p> <p>g. Each fixture shall have an individual power supply.</p> <p>h. Lights shall operate without the engine running.</p> <p>i. Driver's light shall be Xantech Model 727, or approved equal. Light to be recess-mounted in the top of the window frame above driver's head. Do not impair use by location conflict with sun visor. Switch to be located on the bezel of the lamp.</p> <p><u>Passenger Chime Signal</u></p> <p>A chime operated by bell cords, running the length of both sides of the coach, shall be provided. Illuminated "STOP REQUESTED" sign, mounted above the destination sign access door or on the low floor air tank enclosure so as to be visible to all passengers, with automatic chime muting, shall be provided.</p>		
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Transmission Electrical

- a. There shall be an electric shifter compatible with transmission located on left side console.
- b. Transmission engine interlock switch so coach cannot be shut off while in gear.
- c. A waterproof back-up light switch shall be provided on the transmission to energize the back-up lights and de-energize the interior lights with transmission in reverse and master switch in the "RUN" or "NIGHT" position.
- d. A starter lockout switch shall be provided that shall sense transmission gear changes. Starter motor shall be energized only with the transmission in the neutral position.

Radio

Provisions for a two way radio system and wiring shall be provided.

- a. A compartment shall be provided to accommodate the system. The radio box shall be located on inside of the coach within five (5) feet of the driver's seat. The radio's position shall be convenient for servicing. The compartment shall include a clear space twelve inches (12") high, eighteen inches (18") wide, and twenty-four inches (24") deep for the radio. An eighteen inch (18") wide and twenty four inches (24") deep sliding tray shall be provided. The box and conduit shall be waterproof when the service door is closed and the door shall incorporate a keyed latch.
- b. A positive/negative dedicated and isolated power source with a minimum capacity of 30 amps/12 volts, using ten (10) wire shall be provided. The radio circuit shall be wired so that the radio is on when the master run switch is not in the off position.
- c. At a location convenient to the driver and subject to final approval by PURCHASER contractor shall provide and install "silent alarm" (Panic Alarm) switch. The switch shall not be marked or illuminated and be of durable design. The switch shall accommodate connection to the "silent alarm" feature of the radio. Two 12 gauge wires shall be provided from the switch to the transceiver.

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	<ul style="list-style-type: none"> d. Two antenna reinforcement and ground plane plates, twelve inches x twelve inches x one/eighth inch (12" x 12" x 1/8") shall be mounted at locations on the roof body panel at approximately the coach center line. e. Contractor shall provide and install a low profile blade type antenna, or approved equal. One antenna shall be mounted approximately four feet (4') to the rear from the front of the coach for GPS. The second antenna shall be located 15 feet (15') to the rear of the forward antenna for radio. The antennae locations shall have access plates in the interior roof panel below the reinforcement for access to the antenna cables. f. Contractor shall provide and install type RG 58 coaxial cable from the radio box to each antenna location. g. Contractor shall provide any required voltage converters and RF filters necessary to make the radio operate. h. Contractor to provide necessary noise suppression to prevent interference from alternator, fluorescent lighting and other sources. 		
<p>1.18 GENERAL</p>	<p>The powerplant shall be arranged so that accessibility for all routine maintenance is assured. No special tools, other than dollies and hoists, shall be required to remove the powerplant. Two mechanics shall be able to remove, replace, and prepare the engine and transmission assembly for service in less than 20 total combined man hours. The muffler, exhaust system, air cleaner, air compressor, starter, alternator, radiator, all accessories, and any other component requiring service or replacement shall also be easily removable independent of the engine and transmission removal.</p>		
<p>1.19 ENGINE</p>	<p><u>Type</u></p> <ul style="list-style-type: none"> a. Coach shall be powered by a heavy-duty diesel engine, with a minimum 280BHP, 2200 RPM peak torque of 900 foot 1300 RPM, or approved equal. b. Power plant shall be a complete unit, mountable and demountable unit. c. Engine shall meet all applicable Federal and State clean air standards as they pertain to diesel engines. 		

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Installation

The rear mounts for the engine shall be attached to engine bell housing.

Oil Filter

A full-flow Fleetguard spin-on filter mounted to the engine, or approved equal. In addition, a remote mounted centrifuge Spinner II Model 76 Bypass oil filter shall be furnished, or approved equal.

Air Cleaner

The air cleaner shall be a dry type with a dry type in-line separator with broad band attenuation centered about 250 hertz.

The engine air intake duct shall be so shaped as to minimize water entrance into the air induction system, and the element shall be easily replaceable. A passage shall be provided so that any water which does find entry into the system can be drained prior to entry into the air cleaner element. A click-stop restriction gauge shall be provided. Donaldson Model RBX00-2277, or approved equal.

Engine Compartment Lines

Flexible lines (air, fuel and oil) in the engine compartment shall be Aero Quip Teflon lines or approved equal, with stainless steel reusable fittings. Water lines in the engine compartment are silicone. All lines shall be sufficiently secured so that there will be no abrasive movement.

Clamps

All support clamps in the engine compartment and/or on the power module that have direct contact with the wire, cable, harness hose or line shall be insulated from contact with the wire, cable, harness hose, or line by stainless steel Breeze clamps.

Insulation

Engine side of rear seat shall be sealed so as to prevent smoke and fumes from entering passenger area and shall be insulated against both heat and sound. Thermal insulation shall assure

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	<p>there will be a minimum eighty degree (80°) temperature differential between engine compartment and passenger area. Noise transfer to the passenger area shall not exceed 82 DBA.</p> <p><u>Accelerator Control System</u></p> <p>Accelerator shall be Williams with a 45° angle. The throttle pedal shall be mounted so that it is equal to or higher than brake pedal.</p> <p><u>EPM Switch</u></p> <p>A switch will be installed that will allow the Operator to override the shutdown system for the engine. This will allow the engine to be active for a short period of time in order to move the bus in an emergency.</p>		
<p>1.20 FUEL SYSTEM</p>	<p><u>Fuel Tank</u></p> <ol style="list-style-type: none">1. The fuel tank shall be a minimum 120-gallons capacity, with minimum 115-gallons useable, internally baffled to prevent surging and rigidly supported by at least four (4) supports, arranged for easy removal. Tank shall incorporate a sump with a minimum one-half inch (1/2") hex head brass drain plug.2. Shall be equipped with Emco Wheaton Posi/Lock 105 with dry break, and shall be provided with hinged spring loaded cap and hinged access door. Fill rate shall be a minimum of 40 gallons per minute. Filler neck shall be located on the curb side of the coach.3. Bottom draw configured fuel tank and fuel tank sending unit shall be provided to be accessible from underneath the coach.4. The fuel tank shall be designed so as to not permit the spillage of any fuel, with the filler cap properly closed, when the floor of the coach is at any angle from horizontal through 22 degrees from horizontal in any direction for any period of time. This shall be accomplished with the fuel tank filled to capacity as defined by published capacity and whistle cut off point.5. Fuel tank for 30' low floor shall have a minimum 75 gallons useable. <p><u>Fittings and Installation</u></p>		

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	<p>Fittings on fuel and oil lines shall be SAE flared or inverted flare type. Fuel filter and lines shall be installed in such a manner as avoid excessive heat and fire hazard. Restriction fittings, if applicable, shall be in fuel return line and of proper size so as to maintain fuel pressure under all conditions. A swing type check valve in the fuel supply line shall keep the supply line full of fuel when servicing filters or when fuel lines are disconnected in engine compartment.</p> <p><u>Filters</u></p> <p>One (1) FleetGuard OptiGuard FS1020, or approved equal, rem filter.</p> <p><u>Fuel Lines</u></p> <ul style="list-style-type: none"> • Fuel lines in engine compartment shall be Aero Quip FC350 black hose for the supply and return fuel lines from the engine compartment bulkhead to the fuel tank, or approved equal. • Underbody fuel lines shall be sized to meet the requirements of the engine manufacturer. <p><u>Air and Oil Lines</u></p> <p>All lines shall be synflex nylon tubing, or approved equal throughout, except air compressor discharge and turbo oil feed lines, which shall be 2807 stainless steel braid, or approved equal. All hydraulic lines shall be equipped with quick disconnects in the engine compartment.</p>		
<p>1.21 EXHAUST SYSTEM</p>	<p><u>Type</u></p> <ol style="list-style-type: none"> a. The exhaust muffler shall be a stainless steel heavy plate type muffler designed with proper acoustical qualities and tailored to the engine requirements and installation. b. Exhaust pipes shall be constructed of stainless steel metal tubing direct from the muffler to a location in the upper left rear of the vehicle. c. The exhaust system will meet all Federal and State clean air standards. <p><u>System Characteristics</u></p> <ol style="list-style-type: none"> a. Exhaust system shall be constructed so that it will not cause back pressure in the engine or damage to the paint 		

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	<p>on the coach, and shall be anchored as near the end of the exhaust line as possible. It shall be mounted so as to maintain the integrity of its design throughout the life of the coach.</p> <p>b. Exhaust manifolds, muffler and single tail pipe assemblies shall be tight and allow no emission of fumes or smoke other than from open end of tail pipe.</p> <p>c. Access to test port on muffler shall be provided.</p> <p><u>Tail Pipes</u></p> <p>a. Exhaust tail pipes shall be constructed of stainless steel tubing.</p> <p>b. The use of the vertical exhaust outlet shall not increase the overall length of the vehicle, nor shall it be located in such a way as to present a burn hazard to the pedestrian traffic. The termination of the tail pipe shall be such that it complies with FMVSS 108 pertaining to side marker and clearance lights, and exhaust shall be deflected to the rear of the coach.</p>		
<p>1.22 TRANSMISSION</p>	<p><u>Type</u></p> <p>a. Automatic transmission with electronic control and shifter.</p> <p>b. A drain plug of magnetic type, and a flat magnet attached to bottom of oil pan near drain opening, shall be furnished.</p> <p>c. Transmission shall have a built-in oil pump, governor, and an external heat exchanger that utilizes water from the engine cooling system. The heat exchanger shall be located in an accident-free area.</p> <p>d. Transmission shall have a spin-on type external oil filter on both the main pressure valve body input line and the oil cooler output or return line.</p> <p>e. The retarder to have an On-Off switch mounted in overhead electrical compartment or other designated location.</p>		

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<p>1.23 PROPELLER SHAFT AND DRIVELINE</p>	<p><u>Type</u></p> <p>Coach shall be equipped with single front and dual rear wheels. Front wheels and tires shall be balanced and counter weighted where necessary. Alcoa 8.25 x 22.5 machine finished hub piloted wheels, or approved equal shall be provided.</p> <p><u>Tires</u></p> <p>Tires shall be furnished by Purchaser tire Contractor. All standard floor and low floor coaches shall be capable of using standard size 12R22.5, 318/R22.5 or equivalent, except the 30 foot low floor shall be able to use 275/70R x 22.5.</p>		
<p>1.24 AIR SUSPENSION</p>	<p><u>System Characteristics</u></p> <ol style="list-style-type: none"> a. Coach shall be equipped with an air-suspension system. Air suspension system shall consist of four (4) rear and four (4) front Rolling Lobe Firestone air bellows and three (3) leveling valves, or approved equal, by which the air pressure is automatically regulated in proportion to the coach loading. Leveling valve shall be installed in such a manner that will prevent leveling valve roll-over. 30' low floor to have a minimum of 2 front and 2 rear air bellows. b. Air bellows shall act as a flexible connection between body and axle to absorb and cushion road shocks. c. Leveling valves (two rear and one front) shall also act to keep coach body in relatively level position and contain a dampening compensating feature to prevent excessive consumption of air resulting from high-frequency axle movements over rough streets. d. Metal air chambers, if used, shall be guaranteed by the manufacturer for the life of the coach. Methods of construction and the materials used shall be of such manufacture as to permit easy and convenient replacement of bellows. Bellows shall be mounted to provide easy replacement under coach. e. The three (3) height control valves, one (1) at the front axle and two (2) at the rear axle, will retain the height of the body in relation to the axles under all loading conditions. <p><u>Radius Arm Assemblies</u></p> <ol style="list-style-type: none"> 1. Each axle shall have four (4) rubber bushed (lubrication free) radius arm assemblies. 		

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	<p>2. Two (2) lower, one (1) upper, and one (1) lateral to locate the position and to transmit the driving, braking and cornering forces from the road to the coach understructure.</p> <p>3. The front upper radius arm assembly shall have a turn buckle to allow adjustment of the front axle caster without arm removal.</p> <p><u>Shock Absorbers</u></p> <p>Shock absorbers, Koni adjustable or approved equal, shall be provided.</p> <p><u>Axle Stops</u></p> <p>Rubber axle stops shall be provided between the axle and frame on each side of the axles to prevent axle and/or frame damage in severe bounce condition and to allow operation of the coach if one or more air bellows are deflated.</p>		
<p>1.25 POWER STEERING</p>	<p><u>Type</u></p> <p>Power steering shall be Ross Model TAS65, or approved equal. Steering gear shall be an integral type.</p> <p><u>System Characteristics</u></p> <p>Steering effort and number of turns "lock-to-lock" shall be designed and coordinated to minimize driver fatigue. Steering forces and characteristics in the event of failure of the power boost shall enable the coach to be safely driven in this condition.</p> <p>a. Mounting of gear assembly shall be engineered to reduce road shock and vibration.</p> <p>b. Steering mechanism shall be mounted so that all adjustments can be made without dismounting. Steering units shall have hex head filler and drain plugs.</p> <p>c. The drag link assembly shall have a horizontal socket for attachment at the Pitman arm, and a vertical stud for attachment at the steering knuckle arm. Both ends shall have internal springs and lubrication fittings. The assembly shall have plus or minus .50-inch length adjustment.</p> <p>d. Front axle tie rod ends shall be threaded into the tube for adjustment without removal. Lubrication fittings shall be</p>		

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	<p>provided on the nonserviceable end assemblies.</p> <p><u>Steering Wheel</u></p> <p>The steering wheel shall be twenty inches (20") minimum in diameter and shall be black color plastic or synthetic resin construction with a metal core. It shall be provided with puller holes in the hub.</p> <p><u>Steering Column</u></p> <p>Shall be tilt with telescoping steering shaft.</p>		
<p>1.26 BODY</p>	<p><u>Construction: Body and Understructure</u></p> <ol style="list-style-type: none"> a. The basic body structure shall be an integral design. The structure shall be designed for maximum strength, reliability and durability. b. Body and understructure shall be adequately reinforced at all joints and points where stress concentration may occur so that the vehicle will carry the required loads and properly withstand road shocks. c. The entire coach understructure, including the wheelhouses, shall be spray coated with PPG Corashield 7972, or approved equal. d. All interior and exterior metal surfaces shall be cleaned and treated to prevent rust and/or corrosion. After welding in areas where primer was previously applied, all joints shall be brushed to eliminate foreign matter and then the joint shall be cleaned with a phosphorus solution to provide a good base for good paint adhesion. Finally, the joint shall be painted with red oxide primer. e. Aluminum panels shall be properly prepared and primed before final paint. All bolts, nuts, washers, clamps, clips, and similar parts, shall be zinc or cadmium plated or phosphate coated to prevent corrosion. f. All exterior body seams, joints and overlapping panels shall be sealed against entry of water or dust. Where dissimilar metals meet, proper care shall be taken to prevent electrolytic corrosion. g. All material used in the body and chassis, including cross members, posts and panels, shall be of the required strength for the purpose intended and shall be properly treated to res 		

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corrosion. All joints exposed to weather shall be made tight against leakage.

Low Floor

- a. Understructure shall consist of structural stainless steel for maximum durability, reduced maintenance, and weight and improved corrosion resistance. It shall be welded and Huck bolted throughout.
- b. Conventional bolt construction shall be with Grade 8 (traceable) hardware, and shall be used only where necessary to allow for routine disassembly (e.g., the closing crossmember shall be bolted to allow for engine removal at overhaul). No movement at bolted joints shall be allowed.
- c. Understructure at the coach sides in the low floor bus area shall have crash protection consisting of continuous minimum 3/16" stainless steel plate at an angle which will tend to cause an impacting vehicle to subvert. The crash protective steel plate shall be an integral, welded part of the structure, continuous between the wheelwells except for the exit door. Effectiveness of the design shall be documented by successful application of crashworthiness test. Results of such testing shall be submitted prior to delivery of first coach, and must meet the standards set forth in Federal Register Volume 47, No. 195, Section 2.1.2.10.
- d. Understructure at the front and rear overhang (defined as the distance between axle centerline and bumpers) shall be sufficiently robust to permit towing or lifting without special rigging being required. The design shall be verified by submission of those part of the STRUAA (Altoona Test) which address towing/recovery.
- e. The understructure shall incorporate minimum 3/16" steel floor material in the area of the vestibule, the driver's platform and the exit door area. The installation shall be sufficiently rigid to prevent flexing, and to permit rigid mounting of a farebox.
- f. Understructure shall provide protected pathways for hydraulic lines, heater piping, airlines and electrical cabling. PVC tubing shall be used as protective conduit for wires and cables. Joints in lines, hoses, etc. shall be accessible for repairing.
- g. Body structure shall be modern, and aesthetically pleasing without protruding fasteners. Visible exterior fasteners shall

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be kept to an absolute minimum.

- h. All side panels shall be essentially flat, without ripples and with minimal visible joints.
- i. Side panels below the window line shall be aluminum, etched, primed and painted to Purchaser paint scheme. These side panels shall each be replaceable by a mechanic without assistance. Welding, riveting, or adhesive attachment is deemed unacceptable, although adhesive, as a secondary method to control panel resonance will be permitted.
- j. Side panels shall be simple enough in shape to allow fabrication with no more tooling than a shear, brake, and edge roller. Metal panels with compound curves, fluting, curved indentations, etc. will not be permitted.

Construction: Exterior Panels

- a. All exterior panels above the rub rail shall be either riveted or welded to the body frame.
- b. A rub rail shall run the full length on each side of the standard floor coach at the floor line, no rub rail is required on the low floor coach.
- c. Provisions shall be made to integrate transit advertising into the exterior design of the coach. Advertising media, frames, or supporting structures shall not detract from the readability of destination signs and signal lights, and shall not compromise passenger visibility. Advertising provisions shall not cause pedestrian hazards or foul automatic bus washing equipment, and shall not cover or interfere with doors, air passages, vehicle fittings, or in any other manner restrict the operation or serviceability of the coach.

Each coach shall have advertising frames, which shall be limited to one (1) per left side, one (1) per right side, and one (1) per rear of the coach in areas approved by Purchaser as specified herein.

Curb side: For 30' and 35' coach: One hundred eight (108) inches in length parallel with the windows and thirty (30) inches high. For 40' coach: One hundred forty-four (144) inches in length, parallel with the windows and thirty (30) inches high. The sign frame shall be centered between the front wheelwell and the rear door. The sign frame shall also be centered between the bottom of the windows and the rub rail.

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Street side: One hundred forty-four (144) inches in length, parallel with the windows and thirty (30) inches high. The sign frame shall be centered between the front and rear wheelwells. The sign frame shall also be centered between the bottom of the windows and the rub rail.

Rear side: Seventy-two (72) inches in length and twenty-one (21) inches high. The sign frame shall be centered on engine access door.

All sign frames shall be attached to body of coach with rivnuts.

Construction: Hardware

Fasteners must be of non-corroding material or finished to prevent rust and corrosion. Boron fasteners are not acceptable.

Insulation

- a. Interior of body, including roof, must be well insulated against heat, cold and noise.
- b. Roof insulation shall provide polystyrene EPS insulation.
- c. Sidewall insulation shall meet the same specifications as roof insulation. It shall be installed in all sidewalls, window post areas, and areas over the front and rear wheelhouses.
- d. The insulation referred to above, or other additional insulation, shall provide effective sound attenuation for the passenger. The maximum DBA allowable in the passenger compartment is 82.
- e. There shall be Barymat BYUF-14C one inch insulation in the engine compartment to restrict, to the maximum practical extent, the entry of fumes, odors and heat into the passenger area.

Flooring: Plywood

- a. Floor shall be constructed of marine grade, seven (7) ply 3/4", grade AB, or better, with sealed waterproof edges.
- b. The underside shall be primed with PPG Corashield 7972. The cut edges shall be sealed with either white lead, liquid neoprene, liquid urethane, Tuffcote, or Dolchem 606.

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- c. Floor shall be laid in such a manner as to be free from squeaks. All edges shall be over underframe members.
- d. Floor shall be level throughout and all joints between the floor and vertical surfaces shall have a cove molding.
- e. Plywood shall be securely bolted to frame members.
- f. Underframe shall be stiff enough to prevent floor from excessive flexing under normal loads. The floor shall be supported so that when a person of 150 pounds or more steps on any area, there will be no discernible flexing or movement.
- g. The area at the farebox shall be of adequate strength to support farebox safely and durably.
- h. The entire wooden floor shall be thoroughly sanded in preparation for application of floor covering material.

Roof

- a. Roof shall be constructed in accordance with the manufacturer's standard and of sufficient strength and stiffness to prevent vibration, drumming or flexing in service. The low floor roof shall be one piece fiber reinforced plastic (FRP) sheet.
- b. A rear roof hatch shall be provided to meet the requirements of FMVSS 217.
- c. All seams, joints and overlapping panels, shall be thoroughly sealed to prevent the entry of water and dust. Where dissimilar metals meet, proper care shall be taken to prevent electrolytic corrosion.

Stepwells

Front and rear stepwells shall be stainless steel reinforced with steel tubing.

For low floor coaches entrance and exit floor areas are to be sloped to prevent accumulation of water or ice. No risers are permitted, except aft of exit door and may not exceed 8¹/₂" in height for each riser.

Wheelhouse

Wheelhouses shall be of sturdy construction, manufactured of

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	<p>stainless steel, providing ample clearance at front and rear tires under load and under all positions of front wheel steering.</p> <p><u>Fenders</u></p> <p>a. Rubber fenders shall be furnished at each wheelhouse and be formed so as to effectively prevent road water/dirt from splashing up and onto driver's mirror and windows.</p> <p>b. Anodized aluminum retainers or moldings extending around wheelhouse to bottom of lower skirt panel shall be furnished on all wheelhousings.</p> <p><u>Splash Apron</u></p> <p>Splash aprons, made of not less than one-quarter inch (1/4"), three-ply rubberized fabric, or one-quarter inch (1/4") cured masticated tire friction material, black color, shall be provided at the rear of the wheelhousings, projecting downward to a point approximately six inches (6") above ground with coach loaded. Aprons shall have a maximum width compatible with the understructure of the coach.</p> <p><u>Drip Moldings</u></p> <p>Water-deflecting roof gutters shall be provided over the side windows and doors.</p> <p><u>Lines: Fuel, Oil and Water</u></p> <p>Fuel and oil lines shall be seamless annealed copper tubing or 213 Stratoflex or approved equal. Water lines will be silicone and protected with loom when passing through supports and brackets. In the engine compartment, however, all flexible air, fuel and oil lines shall be 213 Stratoflex or approved equal. Brackets shall be installed at each cross frame bulkhead and support.</p>		
<p>1.27 INTERIOR</p>	<p>a. Floor Covering: Installation: Floor covering shall be butt joined. Should any gaps be unavoidable, they shall be filled with color matching material so as to be tight against any influx or seepage of water present in any uneven floor edges which might cause a person, walking on them, to trip. The floor shall be cleaned thoroughly before delivery.</p> <p>b. Floor Covering: Step Treads: Steps at the front entrance and rear exit shall be covered with five-sixteenths inch (5/16") ribbed flooring. Entrance and exit step treads shall include integral molded noses on stainless steel metal</p>		

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backing. Backing to be totally enclosed in rubber.

- c. **Floor Covering: Entrance Area:** Entrance area and front standee area shall be covered with ribbed flooring not less than five-sixteenth inch (5/16") in thickness. The entrance area and the standee area are to be separated by a white strip molded into the flooring. A six-inch (6") stainless steel backing shall be furnished under standee line edge.
- d. **Floor Covering: Ribbed:** Center aisle and rear exit door approach area shall be covered with a ribbed floor covering not less than three-sixteenths inch (3/16") in thickness. Center aisle strip shall be twenty-two inches (22") wide.

E Floor Covering: Smooth floor area under the seats, including driver's area, shall be covered with a mottled smooth floor covering not less than one-eighth inch (1/8") in thickness. The material is to be thoroughly cemented into position throughout the entire area. The floor covering shall not be extended up on the wheelwell housing but shall terminate where the floor covering butts the housing. A stainless steel trim molding shall be installed on the flooring at the point the wheelwell housing and floor covering butt. Floor shall utilize RCA Transit floor or Altro floor as specified by purchaser

Advertising Card Racks

Interior advertising card racks, as integral parts of the light fixtures, shall be provided along each side of the coach to accommodate eleven-inch (11") advertising card signs. The retainers shall be concave and shall support the media without adhesives.

Modesty Panels

NOTE: Bidder is advised to review the wheelchair accessibility requirements in earlier sections of this RFP, as they affect stanchion and modesty panel location and alignment.

Modesty panels shall be installed in the following locations:

- a. At the rear of front stepwell. This panel shall have adequate clearance from the front door, to prevent injury to passenger hand(s) during the opening cycle.

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- b. At the rear of rear stepwell.

Modesty panels shall be attached to handrails with counter-sunk flush fasteners securely attached to stanchion and body side. Panels shall be attached to a bottom extruded anodized aluminum rail for stiffness.

Panels shall be constructed of 3/8 inch thick 14 inch Graylite Lexan. All modesty panels shall be raised three inches (3") above floor level.

Stanchions

- a. In the following locations, vertical stanchions shall be mounted between either the floor or the modesty panel, and either the ceiling or the grab rail:
 - i. At the right rear of the driver's seat.
 - ii. At the inside rear corners of front and rear stepwells.
- b. A handrail constructed of smoothly surfaced anodized extruded aluminum, or approved equal, shall extend from these stanchions to the side of the coach at a height of approximately thirty-four inches (34") from the floor.

Grab Rails

- a. An entrance grab rail shall be provided at the dashboard, minimum height thirty-six inches (36"). It shall be properly located to allow installation of the farebox and access of wheelchairs.
- b. Grab rails shall be installed at the front and rear doors to aid passengers in boarding and alighting.
- c. One full length standee grab rail shall be mounted on each side of the aisle. They shall be no more than seventy-two inches (72") above the coach floor, and their ends shall terminate either in ceiling connections or in elbows.

Stanchions and Grab Rails: Construction

All stanchions and grab rails shall be one and one-quarter inch (1-1/4") welded stainless steel tubing, with fittings that match tubing. Minimum tubing thickness shall be .065-inch. Fittings shall be constructed of stainless steel, cast aluminum, cast zinc, or a corrosion resistant material.

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	<p><u>Driver's Barrier</u></p> <p>a. A full height barrier beginning 6 inches (152 mm) above the floor shall be provided directly in back of the driver's station to separate the driver from the passenger compartment. The barrier shall extend from the left side coach wall to the stanchion at the right rear of the driver's station. This panel shall in no way interfere with the safe normal operation of the coach or restrict movement of the driver's seat.</p> <p>b. The barrier assembly shall be rigid, shall not shake or rattle in service, and shall withstand forces from passengers using it as a handhold. Any screws and/or bolts protruding through the barrier shall have rounded heads to eliminate passenger injury.</p> <p><u>Interior Trim</u></p> <p>Interior panels shall be applied to ensure a neat and finished appearance. Fasteners shall be of such type that they will not loosen because of vibration. Panels shall be supported so as to prevent buckles, drumming, or flexing when the vehicle is in service. All panel joints shall be sealed and covered with protective trim strips to guard against sharp edges.</p> <p>a. <u>Ceiling:</u> Ceiling trim panels shall be Melamine, Melamine bonded to aluminum, or approved equal, one-tenth inch (1/10") minimum thickness.</p> <p>b. <u>Sidewall Panels:</u> Sidewall trim/panels below the windows shall be Melamine, or approved equal, 0.12 inches minimum thickness.</p> <p>c. <u>Sidewall Posts:</u> Sidewall posts between the windows shall be covered with a suitable material and must be approved by COMMONWEALTH OF VIRGINIA.</p> <p>d. <u>Front Area:</u> All interior surfaces forward of the standee line shall be no reflective black or a color complementary to the interior of the coach.</p> <p>e. <u>Rear Area:</u> Panel behind rear settee shall be installed to provide sound attenuation and covered with Medium Gray colored carpet. Material shall conform to the requirements of Federal Safety Standard No. 302-Flammability of Interior Materials.</p>		
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- f. **Trim Moldings:** All trim moldings around wheelwells, stepwells, sidewall, cove area, settee riser, front dash area, and panel below driver's window, shall be stainless steel.
- g. **Color Scheme:** A color scheme shall be furnished for Authority approval upon award of the contract.

Passenger Seats: Type

Passenger seats shall be American Seating Co. #6468, or approved equal. Seating shall meet or exceed all Federal Motor Vehicle Safety Standards.

General

The seat shall be ergonomically designed and shaped to provide optimal lumbar, kidney area and buttocks support.

The thickness of the transverse seat back shall be minimized to increase passenger knee room and coach capacity. The backrest shall not be thicker than 1" at the edges and ½" in the center when utilizing vandal resistant inserts. A curved insert shall allow the seat hip to knee measurements to be greater than the seat pitch.

Seat backrests shall taper toward the top to accommodate required aisle spacing. The aisle between the seats on a 102" wide coach shall be no less than 20" wide at seated passenger hip height and no less than 24" at standing passenger hip height.

Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14". Seats immediately behind the wheel housings may have foot room reduced, provided the wheelhouse is shaped so that it may be used as a footrest.

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SEAT FRAME: Each seated position shall have its own seat frame assembly. The seat shall have well defined individual seating positions. All metal of the standard seat structure including the frame, cantilever, pedestals, beams, mounting brackets and other components shall be stainless steel with beaded finish. The frame shall be constructed of 25mm OD tube with 2mm wall thickness.

The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized to facilitate cleaning. Cantilevered seats shall be mounted to the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12" of the aisle shall be at least 10" above the floor. Cantilever assemblies must be collapsible with pivoting linkages at the lower wall mounting bracket and the junction between the cantilever leg and beam assembly. The lowest part of a pedestal-mounted seat that is within 12" of the aisle, excluding the pedestal, shall be at least 10" above the floor.

The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy absorbing materials to provide passenger protection and, in a severe crash, allow the passenger to deform the seating materials in the impact areas in accordance with the Knee Impact and Head Impact Critical requirements. The minimum radius of any part of the seat back, handhold, or modesty panel in the head or chest impact zone shall be a nominal ¼".

GRAB RAIL: The back of each transverse seat shall incorporate a handhold no less than 7/8" in diameter for standees and seat access/egress. Individual handholds shall be mounted to each seat frame. The service time to exchange grab handles shall not exceed five minutes. The handhold shall not be a safety hazard during severe decelerations. The handhold of all aisle seats shall extend above the seat back near the aisle so that standees shall have a convenient vertical assist, no less than 4" long that may be grasped with the full hand. This handhold shall not cause a standee using this assist to interfere with a seated 50th-percentile male passenger. Handholds on seats not directly on the aisle shall be maximum 3" tall to allow maximum visibility of the seated occupants behind the seat. Each handhold shall also be usable by a 5th-percentile female, as well as by larger passengers, to assist with seat access/egress for either transverse seating position. The

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upper rear portion of the seat back and the seat back handhold immediately forward of transverse seats shall be padded and/or constructed of energy absorbing materials. All grab rails shall be curved to match the curve of an occupant's back torso. Longitudinal seats shall be the same general design as transverse seats but without grab rails.

TEST REQUIREMENTS: All transverse objects, including seat backs, modesty panels, and longitudinal seats, in front of forward facing seats shall not impart a compressive load in excess of 1,000 pounds onto the femur of passengers ranging in size from a 5th-percentile female of a 95th-percentile male during a 10g deceleration of the coach. This deceleration shall peak at .05 ∇ .015 seconds from initiation. Permanent deformation of the seat resulting from two 95th-percentile males striking the seat back during this 10g deceleration shall not exceed 2", measured at the aisle side of the seat frame at height H. Seat back should not deflect more than 14", measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.

The seat assembly shall withstand static vertical forces of 500 pounds applied to the top of the seat cushion in each seating position with less than ¼" permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 pounds evenly distributed along the top of the seat back with less than ¼" permanent deformation in the seat or its mountings. The seat backs at the aisle position and at the window position shall withstand repeated impacts of two 40-pound sandbags without visible deterioration. One sandbag shall strike the front 40,000 times and the other sandbag shall strike the rear 40,000 times. Each sandbag shall be suspended on a 36" pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10, and 12". Seats at both seating positions shall withstand 4,000 vertical drops of a 40-pound sandbag without visible deterioration. The sandbag shall be dropped 1,000 times each from heights of 6, 8, 10, and 12". Seat cushions shall withstand 100,000 randomly positioned 3 ½" drops of a squirming, 150-pound, smooth-surfaced, buttocks-shape striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.

During a 10g deceleration of the coach, the HIC number (as

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defined by SAE Standard J211a) shall not exceed 400 for passengers ranging in size from a 6 year old child through a 95th percentile male. The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where vertical assist is provided.

Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 pounds applied anywhere along their length with less than ¼" permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 pounds with less than ¼" permanent deformation and without visible deterioration.

REPORTING REQUIREMENTS: The Contractor shall be capable of providing a test report fully documenting compliance with all the requirements defined above upon request. The test report shall contain a record of all testing activities, test diagrams, testing equipment, as well as test data related to loads, deflections and permanent deformation of the seat assembly. The report shall include a statement of compliance with the requirements of the Federal Procurement Guidelines (White Book), section 5: Technical Specifications. Testing must be done by an independent, certified testing facility.

WHEELCHAIR ACCOMMODATIONS: Two forward-facing locations, as close to the wheelchair loading system as practical, shall provide parking space and secure tie-down for a passenger in a wheelchair. Additional equipment, including passenger restraint seat belts and wheelchair securement devices shall be provided for two wheelchair passengers. Passenger restraint seat belts shall be provided to accommodate passengers in electrically powered wheelchairs. All belt assemblies must stow up and out of the way when not in use.

Passenger Seats: Transverse

- a. Seat colors shall be provided at pre-production meeting.
- b. There shall be an end closure between the window edge of the seat cushion and back and the interior panel below the window to prevent the accumulation of trash in that area.

Passenger Seats: Longitudinal

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	<p>a. Longitudinal passenger seats shall be provided, two each, in the front and rear of the coach. They shall be of the same color, quality, make and construction as all other passenger seats.</p> <p>b. Location of front seats shall be directly behind driver's seat and front stepwell between tie-down-equipped jump seats.</p> <p>c. Rear longitudinal seats shall be located above the rear wheel wells.</p> <p><u>Passenger Seats: Folding</u></p> <p>Will be used in wheelchair securement area.</p> <p><u>Passenger Seats: Rear Cross</u></p> <p>a. Rear seat shall be a 5-passenger unit.</p> <p>Seat shall be of same color, quality, make and construction as all other passenger seats.</p>		
<p>1.28 DRIVER'S STATION AND CONTROLS</p>	<p><u>Design Factors</u></p> <p>a. The design of the driver's station shall have as its primary objective the provision of an environment for the driver that will aid him or her to operate the coach safely and efficiently for long periods of time with minimum fatigue. Human factors design principles shall be used in the layout and proportioning of the driver's station and its components with attention given to safety, "comfort and fatigue," body support; the size, shape and location of switches, levers, pedals and gauges; and all other factors that affect the design objective.</p> <p>b. The driver's station shall accommodate drivers who are of various heights and body proportions by the use of human factors design in locating and proportioning the devices in the station and by the use of adjustable components such as the driver's seat and the steering column. It is required that the station accommodate drivers within a height range of 57 to 76.5 inches (145 to 194 cm).</p> <p>c. The Contractor shall, as a joint effort with Purchaser, to determine the location of all equipment with respect to proper lighting, ease of operation, accessibility and passenger flow. Factors to be considered include, but</p>		

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	<p>are not limited to, the provision of mountings for and deterring the location of the farebox, radio speaker, radio control head and any other equipment supplied by Purchaser. Complete details of the driver's station design shall be presented at the design review and at the prototype review for approval by Purchaser.</p> <p><u>Driver's Seat</u></p> <p>a. The driver's seat shall be adjustable to provide comfort for drivers within the range of sizes given in the previous subsection. It shall have a full ten (10) inches of adjustment in the fore and aft direction without contacting any coach part. The seat back and seat cushion shall be adjustable and the seat height shall be adjustable. The seat shall be installed in the same location in all coaches. All adjustments shall be easily made without the possibility of crushing or pinching the driver's hand or fingers. A dynamic load damper shall be provided on the seat to augment the springing and padding in the cushions. Rubber bumpers shall be provided to prevent metal-to-metal contact if the seat "bottoms out". Any electrical connections to the seat shall have quick disconnect provisions to allow easy removal and replacement of the seat.</p> <p>b. The entire face of the driver's seat and back cushions shall be fabric and no welt cord shall be used. Seat cushion edges shall be vinyl. Seat cushions shall be of a long lasting, fire resistant foam. Particular attention shall be given to providing a seat which is comfortable in warm, humid weather and which gives full consideration to long period of occupancy.</p> <p>The seat shall be supplied with an inertia locked retractable and adjustable seat belt. The seat belt shall extend from left to right and shall have a usable travel of at least 70 inches measured from the open end of the protective boot to the end of the buckle or latch plate.</p>		
<p>1.29 WINDOWS</p>	<p><u>Windshield</u></p> <p>The windshield shall incorporate a two-piece design constructed of one-quarter inch (1/4") thick safety plate laminated glass. Both right-hand and left-hand windshields shall be retained in the body structure with "zip-lock" black rubber extrusions for ease of maintenance. The driver's windshield shall be tilted 17 degrees-19 degrees to reduce windshield glare. Total glass area shall be twenty-one square feet (21 sq. ft.) minimum.</p>		

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	<p><u>Side Windows</u></p> <ul style="list-style-type: none"> a. Windows shall have black anodized aluminum frames. All windows shall be ¾ lower egress and all windows of the same size shall be interchangeable. All egress handles shall be located towards the front of the coach. Windows shall be designed to prevent the entrance of air and water when windows are closed. Near each window there shall be instructions on decals or aluminum plates that sufficiently explain emergency exit procedures. Location of the metal decal shall be determined by Purchaser. Emergency instructions shall be printed in both English and Spanish. All requirements of FMVSS217 shall be complied with. b. The lower section of the window, approximately thirty inches (30") shall be fixed. The upper portion of approximately nine inches (9") shall be inwardly operable to provide adequate outside air ventilation and shall have locking latches. Transom locks are required. c. Windows shall be one-quarter inch (1/4") laminated safety glass. d. Glazing in the sash shall be replaced without removing the window from its installed position or manipulation of the rubber molding surrounding the glazing. e. All passenger window 1/4" laminated fixed glazing. <p><u>Driver's Window</u></p> <p>Driver's window shall have black anodized aluminum frame with one horizontal sliding sash. The window shall have a ratchet mechanism to prevent uncontrolled sliding. The window shall have an upper fixed lower ¾ slider window assembly. It shall be constructed so that it can easily be adjusted with one-hand operation.</p>		
<p>1.30 WINDSHIELD WIPERS AND WASHERS</p>	<p>Windshield wipers and equipment shall be Sprague Industries Electric, or air operated or approved equal, and shall provide an adjustable time delay feature. The coach shall be equipped with variable speed windshield wiper for each half of the windshield with separate controls for each side. No part of the windshield mechanism shall be damaged by manual manipulation of the arm. At 60 MPH, no more than 10 percent (10%) of the wiped area shall be lost due to windshield wiper lift. Both wipers shall park along the edges of the windshield glass.</p>		

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	<p>Windshield wiper motor mechanisms shall be easily accessible for repairs or service from inside or outside the coach and shall be removable as complete units.</p> <p>The windshield washer system shall deposit washing fluid on the windshield from nozzles attached to the wiper arms and shall evenly and completely wet the entire wiped area. The windshield washer system shall have a reservoir of at least two (2) gallons located for easy refilling. The reservoir itself shall be translucent for easy determination of fluid level. Reservoir, reservoir pumps, lines and fittings shall be corrosion resistant and protected from freezing.</p>		
<p>1.31 PASSENGER DOORS</p>	<p align="center"><u>Front Entrance Door</u></p> <ul style="list-style-type: none"> a. The front door shall be of aluminum, two-section, and slide-glide or bifold type with minimum clear opening dimensions of 31.25 inches wide, or approved equal. b. Door shall be inward opening and shall have stainless steel hinges with joints at the door posts covered by rubber seals, or approved equal. Meeting edges of door shall have four inches (4"), extruded overlapping type rubber safety edges two inches (2") on each half, or approved equal. c. Door shall be fully air-operated with Vapor, or approved equal, door motor. An air shut-off valve, located either immediately above the front door within the header compartment, or at left of driver controls, shall be supplied. When valve is in "Off" position, front door shall be capable of being opened and closed manually. d. Front door area shall have a hand rail to aid in boarding the coach. The hand rails on the wheelchair lift are appropriate. e. Access door to door mechanism compartment shall have a chain or other acceptable device to hold door in the open position, when necessary. <p align="center"><u>Rear Exit Door</u></p> <ul style="list-style-type: none"> a. Rear exit door shall be aluminum two-section outward opening manually opened by passengers and closed by spring-loaded check mechanism. Clear opening of door shall be a minimum of 24.25 inches. b. The door operating mechanism, mounted on a 		

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	<p>removable steel base plate in a compartment directly above the door, shall be a Vapor Corporation, or approved equal, mechanical lock/electric unlock type. Door in closed position shall be locked by a spring-loaded lock lever. To unlock door, lock lever shall be retracted by an electrical solenoid that is energized from a switch in driver's door control valve. When unlocked, door shall be able to be manually opened. Door closing shall be controlled by a return spring mechanism, and the rate of closing shall be retarded by a check cylinder designed to prevent slamming of the door. The rate of closing shall be adjustable, with a speed control valve on the check cylinder.</p> <p>c. Meeting edges of the door shall have four-inch (4") extruded overlapping type rubber safety edges, two inches (2") on each half, or approved equal.</p> <p>d. Rear door shall incorporate safety features as required for power actuated doors not adjacent to the driver. A sensitive edge shall be located on the rear door to prevent accidental closer</p> <p>e. Access door to door operating mechanism shall have a chain or other acceptable device to hold door in the open position, when necessary.</p> <p><u>Door Controls and Interlocks</u></p> <p>a. Both front and rear doors shall be controlled by a five (5) position door operating control, with the following positions:</p> <ul style="list-style-type: none">• Front door open - rear door unlocked• Front door open• Both doors closed• Rear door unlocked• Rear door unlocked - front door open. <p>b. This control shall be located on the console to the left of the operator.</p> <p>c. A brake and accelerator interlock shall be provided that prevents movement of the coach when the rear doors are open. The interlock equipment shall be mounted together as one assembly.</p>		
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- d. A rear door override lever shall be provided for emergency exit. The lever shall be located in the rear, door control, and compartment. The lever is used to release the rear door from the locked position for manual operation and also shall engage the interlock.
- e. A master interlock override switch shall be provided. It shall be located in the electric panel near the driver and shall be in a secure position.
- f. A front door, air override, control valve shall be provided. The valve shall control the release of all air to the front door so that the door may be opened manually.

Door Glass

Each section of the door shall be glazed with one-quarter-inch (1/4") nominal laminated glass.

MIRRORS

Interior Mirrors

- a. Coaches shall be equipped with four inside rear view mirrors.
 - Center rear view mirror above windshield shall be mounted on windshield header panel above and in front of driver. Dimensions shall be 8.25 inches by 16 inches. Mirror shall have a nonreflective black rim and mounting bracket made of steel. Mirror shall be positively mounted to allow for adjustment but to eliminate, to the maximum practical extent, mirror vibration.
 - Right windshield header mirror shall be a six-inch (6") round mirror. This mirror shall be located so as not to interfere with passengers, and shall have an adjustable mounting bracket.
 - A mirror shall be mounted above the entrance door. It shall be 7" x 10" and shall have an adjustable mounting bracket.
 - A twelve-inch (12") diameter mirror shall be mounted above and behind the rear exit door in such a way that it will not interfere with passengers.

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	<p><u>Exterior Mirrors</u></p> <p><u>General</u></p> <p>Coaches shall be equipped with two (2) mirrors, one (1) mounted on the roadside front corner post and one (1) mounted on the curbside front corner post. Roadside mirror just above lower edge of driver's roadside window. Curbside mirror is not to extend further than a twelve inch (12") radius from the corner of coach and shall be mounted on the curbside front corner post.</p> <p><u>Curbside and Roadside Mirrors</u></p> <ol style="list-style-type: none"> a. Mirrors shall be a remote adjustable, B&R two piece, with all metal hardware, or approved equal. The controls shall be located to the roadside of the driver and provide for a full range of adjustment of both glazing of the mirrors. The glass shall be easily replaceable and be secured with Velcro. b. All arms, housings and hardware utilized for the exterior mirrors shall be stainless steel. c. Mirrors shall be mounted on retractable arms. d. Mirror type and location subject to final approval by Purchaser. e. Each mirror shall have a separate flat and convex mirror. There should be no "spot mirror" add-on. 		
<p>1.32 HEATING, DEFROSTING, VENTILATING & AIR CONDITIONING SYSTEMS</p>	<p><u>System Characteristics</u></p> <ol style="list-style-type: none"> a. A heating and ventilating system shall be provided with proper correlation to provide practical maximum comfort to passengers and the operator. Heating and ventilating system shall incorporate introduction of approximately twenty (20) percent fresh air. b. Air for heating and ventilating shall be evenly distributed throughout the coach body in such a manner as to minimize temperature variation. Provision shall be made for minor adjustment of controls to maintain desired temperatures within the coach without changing supply of outside air required for ventilation. 		

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- c. A manual control or modulating valve shall be provided to permit the fans to be used for power ventilation of outside air in warm weather.
- d. Main heating system shall be thermostatically controlled. The heating system shall provide heated, filtered air for an ambient temperature differential from sixty (60) degrees to zero (0) degree F. Heating filtering elements must be of the disposable type.
- e. All motors shall be brushless, or approved equal.
- f. Blower motor(s) shall be two-speed, heavy-duty with adequate output to provide circulation throughout the coach. Blowers shall also circulate fresh air throughout the coach.
- g. Main heater shall be mounted in the rear of the coach above the engine compartment. It shall be a hot water type with heavy-duty motors and a minimum capacity of 110,000 B.T.U. at 100-degree water-air temperature differential, or approved equal. A water shut-off valve shall be provided at the heater.

Driver's Heater

- a. A separate dash heater and blower shall be provided for the driver's comfort and for windshield defrosting. Capacity of 40,000 BTU output at 100-degree water-air temperature differential, is required.
- b. A blower, Model – Red Dot with a Transicoil brushless motor with standard manual control shall be provided.
- c. Defroster blower shall be automatically inoperative if the alternator is not charging.
- d. There shall also be a left foot vent for the Driver's heating system.

Heater Water Lines

- a. Heater water lines shall not be exposed within the coach.
- b. All water lines shall be heavily insulated throughout the coach. They shall be made of heavy-duty copper or brass, except where shock absorbing or flex lines are required.

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Heater Cores

- a. All heater cores shall be of aluminum. Metal used in the tanks shall be of adequate thickness with drawn reinforcements. All radii of the tanks shall be of sufficient size to preclude fatigue failure.
- b. Heater cores, motor and fan must be readily accessible and installed to permit ready removal.

Heater and Blower Motors

- a. All blowers required for the heating and ventilating system shall be balanced statically and dynamically.
- b. All motors required for these blowers shall be heavy-duty type, ECDC motors three-eighth (3/8) horsepower minimum.

Heater Gradustat and Water Pump

Gradustat controlling the heating system shall be protected or screened to prevent tampering and guarded against any possible damage from passenger's feet. Water supply to the heating system to be controlled by a modulating valve. The heater circulating water pump must be an ECDC minimum capacity of fifteen (15) gallons per minute.

Air Conditioning System

- a. The coach shall be equipped with a Thermo King Intelligaire II Model Air Conditioning System with X430 Compressor and Clutch Assembly or approved equal. The motors are to be Reliant brushless. The compressor/clutch assembly mounts in the engine compartment, and is belt driven from either the engine or transmission. If an alternator is also driven from the same PTO, then the compressor and alternator shall be driven by a single serpentine design belt.
- b. The air conditioning unit frame shall be constructed of 5052-H32 structural aluminum of .100 and .182 material thickness for strength, corrosion protection, and light weight. The frame shall be all welded and painted with a high solid polyester paint. All hardware shall be 300 Series stainless steel to protect against corrosion.

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"Neverseerz" anti-seizing lubricant shall be applied to the threads of all stainless steel hardware during unit assembly to prevent thread galling.

- c. The evaporator, heater and condenser coils shall be constructed of 3/8 inch outside diameter seamless Series 122 copper tubing having minimum .0195 inch wall thickness. The copper tubing shall be mechanically expanded into aluminum fins having a minimum thickness of .080 inch. The fin spacing shall be: evaporator and heater coils - 12 fins per inch; condenser coil - 10 fins per inch. The condenser coil shall be dipped in an acrylic base, polyvinyl material to provide a 2 mil thick coating of the entire exterior surface for corrosion protection and quick dirt release during washing. This coating shall not impair the performance of the air conditioning system. The condenser coil shall be mounted to allow easy removal and reinstallation without major disassembly of the unit frame or removal of the unit from the coach. Separate drains shall be provided for the condenser and evaporator/heater sections to allow moisture to be routed out of the unit to the street. Drain seals and/or traps shall be installed at the outlet of the evaporator/heater drain tubes to prevent entrance of dirt or fumes into the coach.
- d. The motors shall be Reliant brushless, or approved equal. The condenser shall have two motors; the evaporator/heater shall have one. Motors shall be selected and applied to maximize efficient operation, airflow and long life. Brush life shall be a minimum of 10,000 hours of operating time. Motors shall be capable of two speed operation. Evaporator/heater motor shall operate at low speed during heat mode and high speed during cool, vent or reheat modes. Condenser fans shall be axial flow type with a steel spider, aluminum blades and aluminum hub. The fans shall be coated with high solid polyester paint for corrosion protection.
- e. Evaporator/heater blowers shall be 9" x 5", forward curve, and single inlet centrifugal type. Regreasable, self-aligning outboard bearings shall support the blower shafts. Heavy duty, ring type flexible couplings shall connect the shafts to the motor.

Temperature and Electrical Controls

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There shall be a unitized control panel consisting of reliable electromechanical relays, magnetic motor circuit breakers, bi-metal control circuit breakers, adjustable return air thermostat with a range of 60° - 90° F, ambient thermostat, evaporator coil anti-freeze thermostat and terminal board for ease of troubleshooting.

This control panel shall be located in the evaporator/heater return air area, or in an enclosed control box if mounted in an ambient location. The return air thermostat shall have a maximum tolerance from set point of 2.5° F.

Electrical Wiring and Terminals

All unit wiring shall be UL758, Style 3173/3196 having copper strands with tinned ally coating rated for up to 600 volts. The insulation shall be cross-linked polyethylene, rated for 125° C and shall be white in color with hot stamp number coding the entire length at a maximum spacing of 1-3 inches. All terminals shall be "forklok" or ring type with vinyl insulation. All terminals shall be machine crimped. Hand crimping is not acceptable. All terminations exposed to ambient shall be coated with glycol for corrosion protection.

Receiver Tank, Dry Eye, Filter/Dehydrator

The unit shall be equipped with a refrigerant receiver tank installed vertically to ensure a steady liquid feed to the expansion valve. The receiver tank shall meet all ASTM requirements and have two (2) sight glasses for checking refrigerant level. The top sight glass shall have a floating plastic ball to indicate proper refrigerant level. A refrigerant dry eye shall be provided in the liquid line, or in the lower sight glass of the receiver tank, to indicate the presence of moisture in the refrigerant system. The unit shall have a disposable liquid line filter/dehydrator.

Refrigerant Hoses, Copper Tubing, Fittings

- a. Suction and discharge hoses shall be provided to connect the air conditioning unit to the compressor. The hoses shall have reusable swivel fittings, Teflon liner, stainless steel interior support coil, stainless steel exterior braid, and asbestos exterior sleeve for abrasion protection. Length of such hoses shall be kept to a minimum to minimize effusion of refrigerant or permeation of moisture.

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- b. All copper tubing provided shall be refrigeration grade, Series 122 seamless type meeting ASTM specifications. All solder joints shall be silver soldered. All flux and scale shall be cleaned from solder joints, prior to soldering, and all tubing exposed to ambient shall be sprayed with fungus proof varnish.
- c. All JIC and SAE swivel fittings of 3/4" flare size and larger shall include "o" rings for added sealing protection. "O" ring material must be compatible with refrigerant.

Expansion Valve

The expansion valve shall be externally equalized. It shall have a replaceable power head and cage assembly and be equipped with a 100 mesh screen at the inlet to prevent contaminants from plugging the seat. The superheat shall be factory set, requiring no field adjustment. The expansion valve bulb shall be clamped to the suction line in the evaporator compartment and insulated from effects of surrounding air temperature. The expansion valve body shall be properly secured and mounted in the return air area for ease of access.

System Performance

The Air Conditioning System shall control the interior coach temperature to meet all White Book temperature control performance requirements defined in Chapter 3.7, INTERIOR CLIMATE CONTROL, of the Department of Transportation URBAN MASS TRANSPORTATION ADMINISTRATION, BASELINE ADVANCE DESIGN TRANSIT COACH SPECIFICATIONS.

System Protective Controls

The air conditioning system will be equipped with the following protective control:

- a. High pressure cutout switch.
- b. Low pressure cutout switch.
- c. Ambient sensing switch 45 + 5 F cutout 55 + 5 F cut-in.
- d. These switches will interrupt the compressor energizing circuit. Both the high and low pressure

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switches will energize a trouble light at the driver's console.

- e. High pressure relief valve.
- f. Evaporator coil freeze protection - The system will be equipped with an evaporator pressure regulator or Anti-Freeze thermostat to prevent condensate freezing on the evaporator coil.

Compressor

- a. The air conditioning system shall be provided with a 4 cylinder, in-line V, X430 reciprocating compressor. The compressor shall be capable of cycling on/off at any operating speed - no unloaders are to be used. It shall have aluminum body, heads and sump; free floating ring type suction valves, free floating ring type discharge valves with spring loaded cage to accept liquid slugging; two ball bearing mains, one on the front and one on the rear of the crankshaft for support; steel connecting rods with replaceable insert bearings on both ends; vanasil alloy ringless pistons, replaceable cast iron cylinder sleeves; gerotor oil pump; 8.9 point oil sump. Synthetic 150 SUS oil shall be used. High and low refrigerant pressure cutout switches shall be mounted on the compressor. Suction and discharge service valves shall be made of brass, with steel stems.
- b. The compressor clutch shall be an electromagnetic design which utilizes a double row, open type ball bearing. The inner race of the ball bearing shall mount on the hub of the front compressor seal plate and shall be held in place by a locking nut. The outer race of the bearing shall be pressed into the pulley cavity and held in place by a snap ring. External Teflon grease seals mounted in the clutch pulley shall hold a large reserve of Exxon Unirex N2 high temperature grease on both sides of the clutch bearing for maximum lubrication. The front seal shall have a grease zerk to conveniently enable bearing relubrication without disassembly of the clutch disc.
- c. The air gap between the clutch disc and mating pulley plate surface shall be adjustable. The clutch pulley plate shall be thick enough to allow for removal of .030 inch of material during resurfacing on a lathe during overhaul.

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<p>1.33 DESTINATION SIGNS</p>	<p>A Luminator 100% LED (amber), automatic electronic Passenger Information Display Sign System, or approved equal, shall be furnished and installed in the coach. The System shall consist of:</p> <p><u>Display Signs</u></p> <ul style="list-style-type: none"> a. Front Sign: 16 rows x 160 columns; display height n 7.7 inches, display width 63". b. Side Sign: 14 rows x 108 columns; display height m 4.2 inches, display width 42". c. Operators Control Unit (OCU) d. Cables and Accessories <p><u>Sign Locations</u></p> <p>The front sign shall be mounted on the front of the coach, near the top edge of the body, behind windshield protection, and in an enclosed but accessible compartment provided by the coach manufacturer.</p> <p>The side sign shall be located on the right side of the coach near the front door.</p> <p>The entire display area of all signs shall be readable in direct sunlight, at night, and in all lighting conditions between those two lighting extremes, with evenly distributed illumination appearance to the un-aided eye.</p> <p><u>Communications</u></p> <p>The System shall be microprocessor-based utilizing approved bi-directional serial communications, such as; S.A.E. J1708 or IBIS, E.I.A. RS-485, between System components, and shall utilize error detection techniques within the communication protocol.</p> <p>Independent Controller Boards shall be mounted in the front and side destination sign. The System shall be capable of communicating with, and/or controlling additional information</p>		

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devices, such as interior information signs, Voice Annunciation devices, farebox, Automatic Vehicle Locator Systems, etc. The System shall provide for destination and/or Public Relations (P/R) message entry.

Flash memory integrated circuits shall be capable of storing and displaying up to 10,000 message lines. Message memory shall be changeable by the use of a PCMCIA Card of not less than (1) megabyte memory capacity but sized according to the message listing noted herein.

The System shall have the ability to sequentially display multiple destination messages, with the route number portion remaining constant "on" mode at all times, if so programmed. It shall also be capable of accepting manual entry of Route Alpha/Numeric information on any/all signs.

The various signs shall be programmable to display independent messages or the same messages; up to two destination messages and one public relations message shall be pre-selectable. The operator shall be able to quickly change between the pre-selected messages without re-entering a message code. Public relations messages shall be capable of being displayed alternately with the regular text and route messages or displayed separately.

An emergency message shall be activated by a push button or toggle switch in a location to be approved by Purchaser. The emergency message shall be displayed on signs facing outside the vehicle while signs inside the vehicle, including the OCU display, remain unchanged. The emergency message shall be canceled by entering a new destination code, or power cycling (after removal of the emergency signal).

The programming software shall provide means of adjusting the length of time messages are displayed in 0.1 second increments up to twenty-five seconds.

Power to the sign system shall be controlled by the master control run switch. The signs shall operate in all positions of this switch except off. The signs shall be internally protected against voltage transients and RFI interference to ensure proper operation in the local environment.

Display and Display Illumination

All sign displays shall consist of pixels utilizing high intensity Light Emitting Diode's ("LED"), for superior outdoor environmental performance, (of amber illumination

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appearance of light wavelength of 590 NM). LED should be made of AlInGaP II, superior UV resistant epoxy lens and superior resistance to the effects of moisture. Each pixel shall have a dedicated LED for illumination of the pixel in all lighting conditions. The Sign System shall have multi-level intensity changes, which adjust automatically as a function of ambient lighting conditions. There shall be no requirement for any fan or any specialized cooling or air circulation.

This LED shall be mounted such as to be visible directly to the observer positioned in the viewing cone, allowing for full readability 65 degrees either side of the destination sign centerline. The LED shall be the only means of illumination of the Sign System. The LED illumination source shall have an operating life M.T.B.F. of not less than 100,000 hours. Each LED shall not consume more than 0.02 watts.

The characters formed by the System shall meet the requirements of the Americans with Disabilities Act (ADA) of 1990 Reference 49 CFR Section 38.39.

Sign Enclosures

All signs shall be enclosed in a manner such as to inhibit entry of dirt, dust, water and other contaminants during normal operation or cleaning. Access shall be provided to clean the inside of the coach window(s) associated with the sign and to remove or replace the sign components. Access panels and display boards shall be mounted for ease of maintenance/replacement. Any exterior rear sign enclosure used shall be made of Polycarbonate material containing fiberglass reinforcement. The vehicle manufacturer shall comply with the sign manufacturer's recommended mounting, mounting configuration, and installation procedures to assure optimum visibility and service accessibility of the Sign System and System components.

Electronic System Requirements

All electronic circuit boards used in the Sign System shall be conformal coated to meet the requirements of military specification MIL-I-46058C. All Sign System components

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shall be certified to have been subjected to a "burn-in" test of a minimum of twelve (12) hours operation in a temperature of 150 degrees F. prior to final inspection.

Front Sign

The front sign message shall be readable by a person with 20/20 vision from a distance not less than 350 feet for signs of display height greater than 8 inches and from a distance not less than 275 feet for display heights less than 8 inches.

The front sign shall have a viewing cone of equal readability at 65 degrees on either side of a line perpendicular to the center of the mean plane of the display. The intensity of the illumination of the display pixels shall appear, to the naked eye, to be approximately uniform throughout the full viewing cone.

Side Sign

The side sign message shall be readable by a person with 20/20 vision, from a distance of not less than 110 feet. The side sign shall have a viewing cone of equal readability at 65 degrees on either side of a line perpendicular to the center of the mean plane of the display. The intensity of the illumination of the display pixels shall appear, to the naked eye, to be approximately uniform throughout the full

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viewing cone.

Operator Control Unit (OCU)

The OCU shall be used to view and update display messages. It shall be recess mounted in a desirable location to best serve operator comfort and ease of use. The OCU shall utilize a multi-key conductive rubber pad keyboard and be designed for transit operating conditions.

The OCU shall contain a display of at least two lines of 20-character capability. The OCU shall contain an audio annunciator that beeps indicating that a key is depressed. The OCU shall continuously display the message associated with the selected destination readings (except the emergency message feature as noted above.)

The OCU shall also contain the capability to manually select the block number sign information (from 1 to 4 alpha-numeric characters) to be sent to the block number sign, independent of any pre-programmed destination sign message information.

If the IBIS interface is required in the Destination Sign System, an auxiliary RS232 (DB9) port shall be made optionally available on the OCU underframe for inputs from any wireless technology that might be envisioned in the future. This auxiliary RS232 port shall operate at 9600 baud and accept commands from a wireless source (such as Spread Spectrum receivers) and will set destination sign addresses as if manually operated by the OCU operator.

If the J1708 interface is selected for the Destination Sign System, an auxiliary J1708 port shall be made available on the J1708 OCU so that auxiliary J1708 commands may be provided to the Destination Sign System from a wireless source that conforms to the J1708 command structure.

Programming

The programming software package shall use the capability of a Pentium 400 Processor PC having not less than 64 megabyte of RAM, and not less than 850 Mb of available hard-disk space, to allow the PCMCIA Cards to be programmed directly from the PC through a PCMCIA Card Port.

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	<p>A Microsoft XP based programming software package shall be supplied, under limited-use license, to generate message lists for the Sign System.</p> <p>The programming software shall be intuitive, of design to facilitate ease of training, and use context-sensitive help features. Reasonable on-site training support shall be provided with the software.</p> <p>This software will provide capability for custom message writing by selection of preprogrammed standard variable width fonts. This allows for creation of a custom font by varying spacing between characters, words, or other message elements. This software also allows for creation of graphic displays with or without text; by selecting preprogrammed graphic sign images and by allowing use of multiple fonts within the same message and graphic symbols placed anywhere within the display area.</p> <p><u>Message Memory Transfer and Update</u></p> <p>The Sign System shall be reprogrammable on the coach vehicle with the use of a PCMCIA Card. A PCMCIA Card slot shall be provided on the OCU face for this purpose. The maximum reprogramming time for a 10,000 line listing shall be one minute. PCMCIA Cards, of appropriate memory capacity based on requirements of the message listing noted below (but not less than 0.5 Megabyte) shall be supplied at the rate of one card for each 50 systems, or fraction thereof, but in any event not less than four such PCMCIA Cards shall be supplied.</p> <p><u>Interconnecting Cabling</u></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Data Communication</td> <td>Single twisted pair (two conductors) cable</td> </tr> <tr> <td>Power Cabling</td> <td>Three conductors connecting to the switched and unswitched (battery) power and a return (battery)</td> </tr> <tr> <td>OCU Unit Cable</td> <td>Single twisted pair</td> </tr> </table> <p>cable between the OCU and front sign.</p> <p><u>Message Listing</u></p>	Data Communication	Single twisted pair (two conductors) cable	Power Cabling	Three conductors connecting to the switched and unswitched (battery) power and a return (battery)	OCU Unit Cable	Single twisted pair		
Data Communication	Single twisted pair (two conductors) cable								
Power Cabling	Three conductors connecting to the switched and unswitched (battery) power and a return (battery)								
OCU Unit Cable	Single twisted pair								

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	<p>Upon receipt of the contract/purchase order the vehicle manufacturer shall supply to the sign manufacturer, within 14 days, a list of the message readings or listings such as to allow the Sign System to be preprogrammed with the correct readings.</p> <p><u>Interior Headsign</u></p> <p>An all LED interior headsign compatible with Automated Voice Annunciator System and Automatic Vehicle Locator System shall be provided.</p>		
<p>1.34 MISCELLANEOUS INTERIOR COMPONENTS</p>	<p><u>Visor</u></p> <p>Padded visors or roller type shades shall be provided on driver's side; one shall be for the windshield and one shall be for the driver's side window. They shall be adjustable horizontally and vertically and shall meet requirements of State law. Visor shall be constructed of heavy-duty material and assembled to last the life of the coach in normal operations. Visor shall incorporate a clip type lock to lock visor in front or side position.</p> <p><u>Safety Equipment Compartment</u></p> <p>An Amerex Model 400T ABC , or approved equal, five-pound (5 lb.) dry chemical fire extinguisher and KD #610-4645, or approved equal, safety triangle kit shall be installed. Safety triangle kit to be securely installed under the front right side longitudinal seat. Location of both the fire extinguisher and the kit to be approved by Purchaser. An Amerex V-25 Automatic Fire Suppression with minimum of 4 nozzles shall be installed in the engine compartment.</p> <p><u>Coat Hook</u></p> <p>A coat hook shall be mounted on the rear post of the driver's window, or driver barrier frame.</p> <p><u>Valuables Compartment</u></p> <p>A compartment/box for storing driver's purse or valuables shall be located under the front of the right front longitudinal seat or a driver's barrier (for the low floor). It shall be of aluminum or steel, 6" x 11" x 20" with a hinged door which can not be securely locked. Design and location to be approved by COMMONWEALTH OF VIRGINIA.</p>		

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<p>1.35 BUMPERS</p>	<p><u>Type</u></p> <p>Energy absorbing front and rear bumpers by Romeo Rim, or approved equal, shall be furnished.</p>		
<p>1.36 TOWING EYES</p>	<p>Two (2) front towing eyes, concealed and located above the bumper, shall be provided on the standard floor coach.</p>		
<p>1.37 WHEELCHAIR ACCESSIBILITY</p>	<p><u>Requirements</u></p> <p>a. Coach, front door entry area, aisle, tie-down area, and tie-downs shall be fully accessible to wheelchair passengers using standard electric wheelchairs in the 95th percentile of wheelchair size, length, width, height, tire size, and tire thickness. In any case, all conventional wheelchair designs shall be accommodated. Adequate provisions, including body modifications, as necessary, shall be made to enable wheelchair passengers to smoothly, quickly, and safely leave the passenger lift platform in a forward position, pass the front door entry area, and move down the aisle to the tie-down area, turn one-hundred eighty (180) degrees, and then move into the tie-down area.</p> <p>b. In addition to the above requirements, the following minimum distances shall be observed in order to ensure adequate accessibility.</p> <p style="padding-left: 40px;">Minimum unobstructed width of lift platform 29 inches</p> <p style="padding-left: 40px;">Minimum length of solid platform 45 inches</p> <p style="padding-left: 40px;">Minimum distance between stanchions at front stepwell and inside front body of coach 42 inches</p> <p style="padding-left: 40px;">NOTE: This area shall be unobstructed by stanchions, grab rails, heating vents or other structures.</p> <p style="padding-left: 40px;">Minimum distance between wheelwells 42 inches</p> <p style="padding-left: 40px;">Minimum unobstructed aisle width 42 inches</p> <p style="padding-left: 40px;">Minimum distance between stanchions at front</p>		

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stepwell and edge of dashboard facing front door
48 inches

Wheelchair Tie-Down Area

- a. Accommodations shall be provided for two (2) wheelchair passengers to be secured in a forward-facing position in the area between the front longitudinal seats and the modesty panels facing the first transverse seats. The length of this area shall be fifty-eight inches (58") or greater, and the width shall equal the length of the transverse seats and the modesty panels. Modesty panels shall be adequately reinforced to withstand impact of wheelchairs.
- b. Fold down longitudinal seats, equal in appearance, design, and quality to the front longitudinal seats, shall be provided in the tie-down areas for use by ambulatory passengers when no wheelchair passengers are on the coach. When the fold-down seats are in the retracted position, there shall be adequate room for wheelchair users to safely and quickly secure themselves with the tie-down equipment. Approximate dimensions of the seats shall be as follows:

Length: 51 inches
Width, when retracted: 9
inches

- c. Wheel securement shall accommodate the wide wheels now being used on some wheelchairs.
- d. A metal instruction plate attached to the bottom of the fold down longitudinal seats shall detail procedures for using the tie-down equipment.

Tie-Down Apparatus

- a. Two seat belts for securement of wheelchair passengers and their wheelchairs shall be provided. Both belts shall emanate from a position on the coach wall immediately to the side of the wheelchair user. Metal couplers for the seat belts shall be attached to the aisle end of the modesty panel behind the wheelchair. When the folding seats are not retracted, the seat belts shall attach to the bottom of the seat such that they are securely bound and not visible. One of the seat belts shall secure the

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	<p>wheelchair user around his lap; the other shall secure electric wheelchairs by locking through the wheels.</p> <p>b. Adequate sheathing, or other reinforcement, shall be used to position the lap belt and coupler ends so that wheelchair passengers, when in the tie-down securement position, may secure the lap belts without assistance and without bending, twisting, or leaning. Lap belts and couplers shall reach the hip level of the wheelchair user in such a way that no torso movement is necessary throughout the tie-down securement procedure.</p>		
<p>1.38 ACCESS RAMP</p>	<p>An access ramp shall be provided at the entrance door. It shall be the Lift-U fold out, or approved equal. The ramp shall have a useable width of thirty-one inches (31") and meet all A.D.A. requirements. The ramp is to be operated by the driver from the seated position. In case of malfunction, the ramp shall be manually stowable.</p>		
<p>1.39 ON-BOARD DIGITAL RECORDING SYSTEM</p>	<p>A digital video recording (DVR) system shall be supplied by the Contractor. This system shall include a recording system capability to record forty-eight (48) plus hours of video.</p> <p><u>Basic System Operation and Requirements</u></p> <p><u>Hardware:</u></p> <p>a. <u>Power Requirement:</u> The DVR shall operate from 18 to 36 VDC. It shall be self-regulating and internally protected from power surges and spikes.</p> <p>b. <u>Physical Attributes of DVR:</u> The DVR shall have a maximum 11.5" x 11.25" x 3" outer housing and weigh no more than 14 lbs.</p> <p>c. <u>External DVR Material Construction:</u> The DVR shall be constructed with a ruggedized outer housing that offers shock and vibration protection.</p> <p>d. <u>External Camera Housing Material Construction:</u> The external camera housing for the DVR system shall be constructed out of ¼" cast aluminum.</p>		

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	<ul style="list-style-type: none">e. <u>Video Inputs</u>: The DVR shall record NTSC/RS170, 1 volt peak to peak video, from up to 8 sources.f. <u>Inputs</u>: The DVR inputs shall be NTSC/RS170 video format. The image capture rate of the system shall be user-selectable up to a maximum 8 frames per second. Playback shall not reduce the quality or resolution of the recorded scenes.g. <u>Color or Black & White</u>: The DVR shall record images in black & white, color, or both depending upon the camera source.h. <u>Audio Input</u>: The DVR shall record and playback a single channel of audio simultaneously with the recorded video.i. <u>External Ports</u>: The DVR shall be supplied with auxiliary ports for custom programming. These shall be a keypad port and a 100base T Ethernet port.j. <u>Removable Drive</u>: The DVR shall be a self-contained removable hard disk unit for storing digitized images and audio information. This configuration shall allow for easy removal of images for playback and archiving. The removable drive shall be portable and interchangeable.k. <u>Dust Resistant Unit</u>: The DVR shall filter dust from entry into the unit.l. <u>Shock Resistant Mounting (all parts)</u>: The DVR shall be designed for heavy-duty automotive use, as well as be enclosed in a tamper-proof housing. The unit shall function within the normal operating characteristics of a coach or transit vehicle and shall be capable of withstanding a shock of 20 G's operational.m. <u>Clock</u>: The DVR shall have an on-board, real-time clock that operates independently of the main power supply. It shall be programmable to automatically adjust for daylight savings time.		
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- n. Lock: The DVR shall employ a key locking mechanism to secure unit contents and provide security to the removable unit.
- o. Impact Sensor: Each vehicle shall have an impact sensor mounted on the front of the vehicle in such a location that would be acknowledged with a front impact with another object.

LCD Keypad

- a. On-line: The LCD keypad shall display the system's on-line status.
- b. Date: The LCD keypad shall display the correct date in relation to the DVR's internal clock.
- c. Time: The LCD keypad shall display the correct time in relation to the DVR's internal clock.
- d. Frames Per Second (fps): The LCD keypad shall display the fps recording rate.
- e. Vehicle ID Number: The LCD keypad shall enable the user to program the vehicle ID number.
- f. Central Station Number: The LCD keypad shall enable the user to program the Central Station IP address and telephone number.
- g. Camera Name: The LCD keypad shall enable the user to program the camera name(s).
- h. Resolution Setting: The LCD keypad shall enable the user to program the camera resolution setting.
- i. Trigger Capture Rate: The LCD keypad shall enable the user to program the trigger capture rate.
- j. Trigger Resolution Setting: The LCD keypad shall enable the user to program the trigger resolution setting.
- k. Six Programmable Inputs: The LCD keypad shall enable the user to program up to six inputs.
- l. ID Name for Input: The LCD keypad shall enable

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the user to program the ID name for each input.

- m. Selectable Frame Per Second (fps) Capture Rate: The LCD keypad shall enable the user to increase the fps capture rate from .25 to 12.
- n. DVR Shut Down Delay: The LCD keypad shall enable the user to program the DVR shut down delay from 0 to 50 minutes.
- o. Audio Enable/Disable: The LCD keypad shall enable the user to enable or disable the audio feature.
- p. Alarm Storage Time: The LCD keypad shall enable the user to program the desired alarm storage time from 0 to 90 days.

Functionality

- a. Digital Video Recorder (DVR): The DVR can digitize, capture and record high-quality images. The images are then stored on the portable removable unit for review and playback at the Central Station. The DVR shall have, at a minimum, the following features and capabilities.
- b. Image Capture: The DVR shall store digitized video images.
- c. Image Capture Rate: The DVR shall capture images at a maximum of twelve frames per second.
- d. Time: The DVR shall record the actual time while recording images. This information shall be tied to images during playback at the Central Station.
- e. Date: The DVR shall record the actual date while recording images. This information shall be tied to images during playback at the Central Station.
- f. Vehicle ID: The DVR shall record the programmable vehicle identification number while recording images. This information shall be tied to images during playback at the

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	<p>Central Station.</p> <ul style="list-style-type: none">g. <u>Camera Source</u>: The DVR shall record the programmable camera name while recording video. This information shall be tied to images during playback at the Central Station.h. <u>File Format of Recorded Images</u>: The recording software should store the images captured via the DVR in a file format that can only be viewed by special software. In addition, it is not readily practicable to alter the pixels with common graphics tools or programs while they remain in the proprietary file format.i. <u>Recording Audio</u>: The DVR shall have the ability to record single channel audio.j. <u>Initialization of Recording</u>: The DVR shall be signaled to begin recording at the start-up of the engine run switch of the vehicle.k. <u>End Recording</u>: The system shall remain fully functional for a programmable period of time up to fifty minutes after the ignition has been turned off. This process shall be initiated by deactivating the engine run switch.l. <u>Continuous Recording</u>: The DVR shall be capable of continuous image recording at a user-defined recording rate.m. <u>Loop Recording</u>: The DVR shall record continuously onto the removable hard drive. The system recognizes when the available storage capacity for surveillance images has reached capacity and automatically begins to purge the oldest data in sequential fashion, making room for additional images without operator intervention. Images that are tagged due to the activation of the system's inputs are protected from automatic overwriting until the relevant images are manually deleted, or until all available space is filled with tagged images, at which time the system performs a "first-in, first-out" (FIFO) overwrite.n. <u>Event Tagging</u>: The DVR shall tag events when a system input, such as a panic button,		
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	<p>is activated. Tagged events are stored on the hard drive. When retrieved, the tagged events shall be easily identifiable and will remain saved for a programmable period of time before being overwritten.</p> <ul style="list-style-type: none"> o. <u>Synchronized Audio and Image Playback:</u> The Central Station software shall have the ability to playback image databases with single channel audio if this option has been previously configured on the DVR. p. <u>System Software:</u> System shall come with the latest version of the software capable of installation on a PC already dedicated to video surveillance. q. <u>GPS:</u> The DVR unit should have the ability to record GPS coordinates and display same on video playback. r. <u>Wi-Fi:</u> The DVR shall have Wi-Fi enabled access to allow remote viewing as well as auto downloading of event tagged recordings. <p><u>System Upgrade</u></p> <ul style="list-style-type: none"> a. The system's hardware and software shall be capable of being upgraded in the field. The upgrade shall be easy and user friendly. b. The DVR may be programmed with time, date, and vehicle I.D., as well as camera input and capture rate via keypad programming or Ethernet port. <p><u>Hardware Warranty</u></p> <p>A 12-month hardware warranty, from the date of invoice, shall be provided.</p>		
<p>1.40 RADIO SYSTEM</p>	<p>A compartment shall be provided to accommodate a communication system enabling the driver to contact the dispatcher.</p> <p>It shall be located within five (5) feet of the driver's seat and shall be connected to the driver's area by waterproof, two and one-fourth (2 1/4) inches inside diameter, metallic conduit. The compartment shall include a clear space twelve (12) inches high, eighteen (18) inches wide, and twenty-four (24) inches deep for location of radio.</p>		

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	<p>It shall be accessible from inside the coach and shall be splash proof when the service door is secured. The radio compartment shall be supplied with a 30 amp, 12-volt, DC protected service with positive and negative leads. The radio control head shall be located convenient to the driver and shall be provided for the radio control head, speaker, and handset. The final location will be determined at the pre-production meeting. Provisions for attaching an antenna to the roof and routing an antenna lead to the radio compartment shall include a three-fourths (3/4) inch inside diameter conduit. The antenna mounting and lead termination shall be accessible from the coach interior.</p> <p>A Motorola XTL2500, mobile unit, operating at assigned frequencies of:</p> <p align="center">854.11250 855.11250 809.11250 810.11250 810.8125 855.8155</p> <p>The radio shall be provided and installed by the bus manufacturer.</p> <p>Options to include:</p> <p align="center">Key lock mount and on/off switch 10-watt speaker audio External emergency pushbutton (panic/covert alarm) Handset with armored cable</p>		
<p>1.41 PUBLIC ADDRESS SYSTEM</p>	<p>A public address system shall be installed that enables the driver to address passengers either inside or outside the coach. The public address system specified by Purchaser</p> <p>Inside speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. A speaker shall be provided outside the coach so that announcement can be clearly heard and understood by passengers standing near the front door. A driver-controlled switch shall select inside or outside announcements. A separate volume control shall be provided for the outside system if volume adjustment would otherwise be necessary when switching from inside to outside. The system shall be</p>		

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	<p>muted when not in use. The microphone shall be mounted on a heavy-duty, flexible, gooseneck that allows the driver to comfortably speak into it without using his hands. An input jack shall be provided in the driver's area for a handheld microphone. The input jack shall be wired so that the handheld microphone shall work when the gooseneck microphone is removed. The public address system will be activated by a foot control by driver's left foot.</p>																													
<p>1.42 WARRANTY</p>	<p>Warranties in this document are in addition to any statutory remedies or warranties imposed on the contractor. Consistent with this requirement, the contractor warrants that it will comply with the general and specific terms and requirements of these specifications for Advance Design Transit Coaches with respect to providing Purchaser with transit coaches, specific sub-systems, components, and replacement parts of the quality, design, materials, and construction specified in the technical specifications.</p> <p>The coach is warranted and guaranteed to be free from defects for two (2) years or 100,000 miles, whichever comes first, beginning on the date of acceptance of each coach. During this warranty period, the coach shall maintain its structural and functional integrity.</p> <p>Specification sub-systems and components are warranted and guaranteed to be free of defects for the mileages stated in below:</p> <p align="center">SUB-SYSTEM AND COMPONENT WARRANTY WHICHEVER OCCURS FIRST</p> <table border="1"> <thead> <tr> <th align="left">ITEM</th> <th align="center">YEARS</th> <th align="center">MILEAGE</th> </tr> </thead> <tbody> <tr> <td>Transmission</td> <td align="center">2</td> <td align="center">Unlimited</td> </tr> <tr> <td>Drive Axle</td> <td align="center">2</td> <td align="center">100,000</td> </tr> <tr> <td>Brake System (Excluding friction material)</td> <td align="center">2</td> <td align="center">50,000</td> </tr> <tr> <td>Heating, Ventilation & A/C System</td> <td align="center">2</td> <td align="center">2 Seasons</td> </tr> <tr> <td>Basic Body Structure</td> <td align="center">12</td> <td align="center">600,000</td> </tr> <tr> <td>Driver Seat System</td> <td align="center">5</td> <td align="center">250,000</td> </tr> <tr> <td>Wheelchair Lift</td> <td align="center">1</td> <td align="center">50,000</td> </tr> <tr> <td>Catalytic Converter (if equipped)</td> <td align="center">3</td> <td align="center">150,000</td> </tr> </tbody> </table> <p>The contractor shall warrant that any components sub-systems, etc. shall carry with them an implied warranty and they are merchantable and reasonably fit from the general use and the same warranty exists where an examination, if</p>	ITEM	YEARS	MILEAGE	Transmission	2	Unlimited	Drive Axle	2	100,000	Brake System (Excluding friction material)	2	50,000	Heating, Ventilation & A/C System	2	2 Seasons	Basic Body Structure	12	600,000	Driver Seat System	5	250,000	Wheelchair Lift	1	50,000	Catalytic Converter (if equipped)	3	150,000		
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	<p>available, would be fruitless as in the case of latent defects.</p> <p>During the extended service warranty, the Contractor will pay for all parts and labor needed to repair the damage to the engine and/or the transmission resulting from the warrantable failure. The successful bidder shall provide COMMONWEALTH OF VIRGINIA with a list of all components that exceeds the warranty requirements of this specification.</p> <p>A defect is detected within the warranty periods defined in these specifications, the Contractor's representative shall be notified. Within five (5) working days after receipt of notification, the Contractor's representative shall either agree that the defect is in fact covered by warranty, or reserve judgment until the subsystem or component is inspected by the Contractor's representative or is removed and examined at Purchaser property or at the Contractor's plant. At that time, the status of warranty coverage on the subsystem or component shall be mutually resolved, if possible, between Purchaser and the Contractor. Work necessary to effect the repairs shall commence within ten (10) working days after receipt of notification by the Contractor.</p> <p>When warranty repairs are required, Purchaser and the Contractor's representative shall agree within five (5) days after notification on the most appropriate course for the repairs and the exact scope of the repairs to be performed under the warranty. If no agreement is obtained within the five (5) day period, Purchaser reserves the right to commence the repairs and to enforce the warranty provisions and guarantee by recourse to legal action. The contractor warrants that whenever any change is required to strengthen or correct a defect or efficiency of the coaches, this correction shall be made for all coaches at the contractor's expense.</p> <p>A fleet defect is defined as the failure of identical items covered by the warranty and occurring in the warranty period in a portion of the coaches delivered under this contract. The portion shall be at least twenty-five (25%) percent of the fleet. The corrective action taken for a fleet defect shall survive the balance of the original warranty or be warranted for one (1) year or 50,000 miles whichever is longer. The extended warranty shall start when the defect is corrected on each coach, on a coach by coach basis.</p> <p>The Contractor shall correct a fleet defect under the</p>		
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	<p>warranty provisions and shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same defect in all other coaches purchased under this contract. The work program shall include inspection and/or correction of the potential or defective parts in all of the coaches.</p> <p>The warranty on items determined to be fleet defects shall be extended to cover the time and/or miles of the original warranty, and the time and/or miles between the date a fleet defect was determined to exist until the time and/or miles that the repair or replacement of the fleet defect has been completed, shall not count against the time and/or miles of the warranty provisions.</p> <p>The warranty shall not apply to any part or component of the coach that has been subject to misuse, negligence, accident or that has been repaired or altered in any way so as to affect adversely its performance or reliability, except insofar as such repairs were in accordance with the Contractor's maintenance manuals and the workmanship was in accordance with recognized standards of the industry. The warranty shall also be void if Purchaser fails to conduct normal inspections and scheduled preventative maintenance procedures as recommended in the Contractor's maintenance manuals.</p> <p>The fleet defect provisions shall not apply to coach defects caused by non-compliance with the Contractor's recommended normal maintenance practices and procedures.</p> <p>The warranty shall not apply to scheduled maintenance items, and items such as tires and tubes, nor to items furnished by Purchaser such as radios, fareboxes and other auxiliary equipment, except insofar as such equipment may be damaged by the failure of a part or component for which the Contractor is responsible.</p> <p>Fleet defect warranty provisions shall not apply to damage that is a result of normal wear and tear in service to such items as seats, floor covering, windows, and interior trim and paint.</p>		
<p>1.43 WARRANTY REPAIRS</p>	<p>PROCEDURES</p> <p>Purchaser shall require the Contractor or its designated representative to perform warranty covered repairs that are clearly beyond the scope of Purchaser capabilities.</p>		

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Purchaser personnel may do the work with reimbursement by the Contractor.

REPAIRS BY THE CONTRACTOR

If Purchaser requires the Contractor to perform warranty covered repairs, the Contractor's representative must begin, within ten (10) working days after receiving notification of a defect. Purchaser shall make the coach available within the Contractor's repair schedule.

The Contractor shall provide, at its own expense, all spare parts, tools, and space required to complete repairs. At Purchaser's option, the Contractor may be required to remove the coach from Purchaser's property while repairs are being affected. If the coach is removed from Purchaser's property, the contractor shall be responsible for the transportation cost and the contractor's representative must diligently pursue all repair procedures.

REPAIRS BY PURCHASER

If Purchaser performs the warranty covered repairs, it shall correct or repair the defect and any related defects using Contractor specified spare parts available from its own stock or those supplied by the Contractor specifically for this repair. Purchaser shall determine whether a component is repaired or replaced. Monthly or at a period to be mutually agreed upon, reports of all repairs covered by this warranty shall be submitted by Purchaser to the Contractor for reimbursement or replacement of parts. The contractor shall provide forms for these reports. Reimbursement for Purchaser supplied parts shall be calculated from the OEM parts price list in effect at the time of the repair.

PARTS

CONTRACTOR SUPPLIED PARTS

PURCHASER may request that the contractor supply new components or parts necessary for warranty covered repairs being performed by Purcaser. These parts shall be shipped prepaid to PURCHASER from any source selected by the contractor within ten (10) working days of receipt of the request for said parts.

DEFECTIVE COMPONENTS RETURN

The Contractor may request that parts covered by the

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	<p>warranty be returned to the manufacturing plant. The Contractor shall pay the total cost for this action. Materials should be returned in accordance with Contractor's instructions, except that returns shall be to the contractor's plant and not drop shipped to various suppliers.</p> <p>REIMBURSEMENT FOR LABOR</p> <p>The Contractor for labor shall reimburse Purchaser. The amount shall be determined by multiplying the number of man hours actually required to correct the defect by the current average per hour "in house mechanics hourly rate" (presently \$22.53/hour plus 52% for fringe benefits). These wage and fringe benefit rates shall not exceed the rates in effect in Purchaser service garage at the time the defect corrections are made.</p> <p>REIMBURSEMENT FOR PARTS</p> <p>The Contractor shall reimburse PURCHASER for parts that must be replaced to correct a defect.</p> <p>The reimbursement shall be at calculated from OEM parts price list in effect at the time of repair and 15% handling costs.</p> <p>WARRANTY AFTER REPLACEMENT/REPAIRS</p> <p>If any component, unit, or sub-system is repaired, rebuilt or replaced by the Contractor or by Purchaser personnel, with the concurrence of the Contractor, the subsystem shall have the un-expired warranty period of the original sub-system.</p>		
<p>1.44 EDUCATION AND TRAINING</p>	<p>GENERAL REQUIREMENTS</p> <p>This section establishes the requirements for contractor supplied services in support of the purchase of coaches. These services shall be provided both prior to, during, and after delivery of the vehicle to Purchaser. System support services includes, but is not limited to, lesson plans and outlines, special studies to improve vehicle safety, reliability, general economy and PURCHASER maintenance procedures relating to the successful deployment of the acquired vehicles. This section outlines specific requirements for education/training, publications, field service engineering, spare parts and special tools and equipment for maintenance, fault diagnosis, and testing.</p> <p>The contractor shall provide an educational program for</p>		

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COMMONWEALTH OF VIRGINIA's supervisory staff and maintenance personnel of a quality and depth sufficient to permit satisfactory deployment, use, servicing, and maintenance of the vehicle furnished. The training program shall include formal and informal instruction with use of slides, models, mock-ups, samples, manuals, diagrams, parts catalogs, schematics, wall charts, and other training aids. All courses of instruction shall be presented in the English language. Training shall be conducted within 14 days after delivery of the first coach. All training shall be conducted at Purchaser facility.

TRAINING PROGRAM

The contractor shall within sixty (60) days before delivery of the coaches, submit to PURCHASER for approval, an outline of the education and training program designed in accordance with these technical specification. The program shall provide for formal classroom instruction and a period of time to perform maintenance functions in on-coach and in shop environments.

TRAINING SCHEDULE

The following outline is the minimum training program required by Purchaser.

Training for major components (Engine, Transmission, A/C, etc) shall be conducted by the manufacture.

This training is to be conducted for each delivery of new coaches.

All training shall be conducted at PURCHASER facilities and scheduled jointly by PURCHASER and the Contractor.

All training will include material such as diagnostic, maintenance and/or operational manuals.

A master copy of all training material must be delivered to Purchaser.

TRAINING HOURS

The contractor shall provide PURCHASER as part of this five year contract 200 hours of training. This training shall include classes on Basic familiarization, HVAC systems, Electrical systems, transmission, Diesel Engine, Hybrid system (engine/transmission/battery, etc), fuel systems and any other course that may be required by PURCHASER that

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	deals with the maintenance of the bus. The courses will have between 5 to 10 trainees per class.														
1.45 MANUALS AND CATALOGS	<p>a. Three (3) copies each of complete parts books for coaches is furnished prior to delivery of the coaches which will permit the stocking of spare parts.</p> <p>b. Four (4) copies of service manuals shall be provided. The service manual shall have all information needed for on-bus running maintenance and adjustment, and on-line trouble diagnosis of each system including such data as troubleshooting guides and schematics for the vehicle and each of its systems. (Engine, transmission, A/C and heating, Wheelchair lift, Electronic destination sign, etc.).</p> <p>c. Four (4) copies of heavy repair maintenance manuals shall be provided. The manual shall contain a detailed analysis of each component of the coach so that mechanics can effectively and safely service, inspect, maintain, adjust, troubleshoot, repair, replace, and overhaul the coach. The manuals shall be coach specific.</p> <p>d. Ten (10) copies of drawings showing wiring schematics of auxiliary circuits, including air line diagrams and other necessary prints for the maintenance of these coaches are furnished.</p> <p>All manuals shall also be provided on an electronic medium, Such as a CD-ROM. The contractor must also provide appropriate software to view the manuals. This does not replace the printed material above.</p>														
1.46 REPLACEMENT PARTS	A supply of replacement parts for the coaches specified shall be guaranteed for a period of fifteen (15) years by issuing revised pages or otherwise notifying PURCHASER of new or superseding parts and maintenance practices.														
1.47 PAINTING AND DECALS	<p><u>Painting</u></p> <p>DuPont low VOC paint shall be applied to all exterior surfaces.</p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">COLOR</th> <th style="text-align: left;">NAME</th> <th style="text-align: left;">NUMBER</th> </tr> </thead> <tbody> <tr> <td>White</td> <td>Soft White</td> <td>8000</td> </tr> <tr> <td>Black</td> <td>Semi Gloss Black</td> <td>DU-9826</td> </tr> <tr> <td>Grey</td> <td>Strato Grey</td> <td>33128</td> </tr> </tbody> </table> <p>PURCHASER shall approve all paint schemes and color</p>	COLOR	NAME	NUMBER	White	Soft White	8000	Black	Semi Gloss Black	DU-9826	Grey	Strato Grey	33128		
COLOR	NAME	NUMBER													
White	Soft White	8000													
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combinations at the pre-production meeting.

All exterior surfaces shall be smooth and free of wrinkles and dents. Paint shall be applied smoothly and evenly with the finished surface free of dirt and other imperfections.

Coach number location shall be finalized at the pre-production meeting.

Decals

The following decals shall be provided. Preferred letter style is "HELVETICA MEDIUM, all upper case.

<u>MESSAGE</u>	<u>LOCATION</u>	<u>COLOR*/HEIGHT</u>
Preproduction	of the bus - TBD at Preproduction	3" (CRILLIE)
Coach number	Interior above windshield	White 2"
For your safety and security, continuous audio/video monitoring may be occurring on this vehicle video & audio recorded	Interior above windshield	
"Watch your step"	Front stepwell	Red (reflective) 2"
(Operating Instructions)	Above exit door	Black Mfg. Std.
(Operating Instructions)	At emergency escapes	Black Mfg. Std.
"For passenger safety, Federal law prohibits operation of this bus while anyone is standing forward of the white line"	Interior above windshield	Black Mfg. Std.
(Illustrated - No Smoking /Food/Radio)	Front destination sign door	Black Mfg. Std.
"On Off"	Side console on valve	Black Mfg. Std.

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	<p>"Diesel Fuel" Inside fuel filler door Black Mfg. Std.</p> <p>"Oil" Inside oil filler door Black Mfg. Std.</p> <p>"Caution 'Water' Hot" Inside surge tank filler door Mfg. Std.</p> <p>"Caution – Negative Ground" Inside battery compartment Mfg. Std. door</p> <p>"Exit through back door" Interior above windshield Black Mfg. Std.</p> <p>"Wait for light" Interior above rear door to Black Mfg. Std. right</p> <p>"Push door to open" 2 locations-Interior on top Black Mfg. Std. panel of each door</p> <p>"Never cross in front Above front passenger door Black Mfg. Std. of bus"</p> <p>"As a courtesy, please allow Above front longitudinal Black Mfg. Std. older adults and people with disabilities passengers to use these seats"</p> <p>International Handicapped Symbol (2) Black Mfg. Std.</p> <p>Coach Number TBD at Pre production Black on White, See Painting and Decals section or White on Black on previous page</p> <p>*On approval of Purchaser, specified color may be changed in response to interior color scheme.</p>		
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<p>1.48 OPTIONS Items</p>	<p>1. An Engler Hubodometer "million mile" (no tenths), or approved equal shall be installed, with the correct bracket, on curbside rear axle flange studs.</p> <p>2. Key switch to lock out transmission.</p> <p>3. PASSENGER INFORMATION AND ADVERTISING: Provisions shall be made on the rear of the driver's barrier for a frame, to retain information sized twenty-one (21) inches wide and twenty-two (22) inches high posted by Purchaser, such as routes and schedules. Three (3) pocket holder 6-1/2 inches H x 3-3/4 inches W x 1-1/2 inches D and two (2) sheet paper holder to accept standard 8-1/2 x 11 inch, also an additional pocket holder by rear exit door.</p> <p>4. Sliding Windows</p> <p>5. STOP ANNOUNCEMENT SYSTEM: An automatic stop announcement system such as the Digital Recorders DR600 Talking Bus System, or approved equal shall be provided and installed on each coach.</p> <p>6. FAREBOX A GFI Odyssey Model shall be provided by Contractor. Exact model number to be confirmed by PURCHASER at the pre-production meeting and dependent on the style of vehicle selected.</p> <p>7 RADIO SYSTEM . The contractor is also to install five (5) digital cameras, location to be decided at pre-construction meeting and one (1) microphone. There must be a decal that is clearly visible to boarding passengers that they are being recorded.</p> <p>8. AUTOMATIC VEHICLE LOCATOR SYSTEM The Contractor is to provide pricing for a Siemens Mass Transit Master MTD unit with associated wiring and antenna.</p> <p>9. BIKE RACK</p>		
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	<ul style="list-style-type: none">a. Length x width dimensions of the carrier (excluding mounting brackets) shall be 66 inches x 27 inches.b. Weight of the carrier (excluding mounting brackets) shall not exceed 30 lbs.c. Materials:<ul style="list-style-type: none">carrier frame-steel tubingarm hinge-steelarm housing-stainless steelarm-stainless steellatch handle-stainless steellatch-plated steelmounting bracket-steeld. Finish on all steel parts shall be smooth, free of burrs, and shall be chip resistant powder coat. Stainless steel hook arm and latch handle are not powder coated.e. The carrier is to be mounted to the front of the bus and shall have two positions. In the stored position, it shall be folded up against the front of the bus protruding a minimal amount in front of the bumper. In the deployed position, it shall be folded down and ready to accept bicycles.f. All outside corners are to be rounded for the safety of both bike riders and maintenance personnel and to prevent damage to bus washers.g. The carrier or its mounting brackets when folded down will not interfere with access to the front panel of the bus.h. The carrier when folded up shall not interfere with the windshield wipers.i. The carrier shall be able to be unlatched and lowered into position by the user with one hand. User shall have second hand free to support bicycle.j. The carrier shall be able to load and unload from the front of the bus or the "curb-side" of the bus.k. Average load or unload time shall be 15 seconds		
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	<p>or less for either bicycle including lowering the rack from the folded position if required. The rider shall require no assistance from the bus operator.</p> <ul style="list-style-type: none">I. The carrier shall be able to accommodate all bicycle types with wheels larger than 16" in diameter, excluding tandems.m. The carrier shall be able to support over 200 pounds in the central portion when lowered.n. The bicycles shall be able to be independently loaded and unloaded allowing the bike closest the bus to be loaded or unloaded without having to unload the outside bike.o. The carrier shall contact the bicycle's tires only-no contact shall be made with the frame of the bike.p. The carrier shall not have any straps or cords to attach the bicycle to the carrier. There shall not be any loose parts to get lost.q. The bicycle support arm shall be self storing. The arm shall require no action by the bicycle rider to store the arm to prevent it from hitting the bus when the carrier is folded into the stored position.r. The carrier shall not require the pedals of the bicycle to be oriented prior to loading or securing it on the carrier.		
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End of Specifications

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Specification	Description	Does your bid comply?	
Reference		YES	NO
		Explain	
	<p>FOR</p> <p>30' 35' 40'</p> <p>LOW FLOOR BUSES</p> <p>TYPE II</p> <p>TECHNICAL SPECIFICATIONS</p> <p>Lot 2</p>		
2.0 General Technical Specifications	<p>These Technical Specifications cover requirements for Low Floor Heavy Duty Diesel Transit coaches which may be used for rural and urban transit service operations on urban streets and rural roadways in the general environmental and climatic conditions prevailing throughout COMMONWEALTH OF VIRGINIA operating area. It is intended for the widest possible spectrum of adult passengers, elderly, and the handicapped.</p> <p><u>It shall have a minimum expected life of 12 years or 500,000 miles, whichever comes first, and is intended for the widest possible spectrum of adult, passengers, elderly, and persons with disabilities. This includes following all federal requirements and conditions as indicated in Attachment E number 5, but not limited; to all numbers under the conditions.</u></p> <p>It is the intent of this specification to describe the design requirements for a Heavy Duty Diesel Transit coach rugged enough to withstand rigorous intensive daily transit service operations and provide maximum reliability and availability, with a minimum of maintenance and repair time. The coach shall exhibit maximum passenger appeal in appearance, comfort and safety, combined with excellence in reliability, operating characteristics, efficiency, and economy of operation.</p> <p>The coach shall be fully compliant with the applicable requirements of the Americans with Disabilities Act (ADA) and any revisions published by the Architectural and Transportation Barriers Compliance Board or The Federal Transit Administration for fixed route operations. Where these specifications exceed the requirements of ADA, the specification requirement shall apply.</p> <p>Included in this specification is the description for low floor 30, 35, and 40 foot heavy-duty transit coaches.</p>		
2.1 Quality Assurance Requirements	<p>The Contractor, the Contractor's manufacturing plant and organization shall be certified to the appropriate QS-9000/ISO 9000 series of standards.</p>		

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<p>2.2 Inspection Station</p>	<p>Inspection stations shall be at the best locations to provide for the work content and characteristics to be inspected. Stations shall provide the facilities and equipment to inspect structural, electrical, hydraulic, and other components and assemblies for compliance with the design requirements.</p> <p>Stations shall also be at the best locations to inspect or test characteristics before they are concealed by subsequent fabrication or assembly operations. These locations shall minimally include underbody structure completion, body framing completion, body prior to paint preparation, water test before interior trim and insulation installation, engine installation completion, underbody dress-up and completion, bus prior to final paint touchup, bus prior to road test, and bus final road test completion.</p>		
<p>2.3 Resident Inspector Role</p>	<p>The Procuring Agency shall be represented at the Contractor's plant by resident inspectors. They shall monitor, in the Contractor's plant, the manufacture of transit buses built under the procurement. The presence of these resident inspectors in the plant shall not relieve the Contractor of its responsibility to meet all of the requirements of this procurement. The Procuring Agency shall designate a primary resident inspector, whose duties and responsibilities are delineated in "Pre-Production Meetings".</p>		
<p>2.4 Pre-Production Meeting</p>	<p>The primary resident inspector shall participate in design review and pre-production meetings with the Procuring Agency. At these meetings the configuration of the buses and the manufacturing processes shall be finalized, and all contract documentation provided to the inspector.</p> <p>No less than thirty (30) days prior to the beginning of bus manufacture, the primary resident inspector shall meet with the Contractor's quality assurance manager and shall conduct a pre-production audit meeting. They shall review the inspection procedures and finalize inspection checklists. The resident inspectors may begin monitoring bus construction activities two weeks prior to the start of bus fabrication.</p>		
<p>2.5 Authority</p>	<p>Records and data maintained by the quality assurance organization shall be available for review by the resident inspectors. Inspection and test records for this procurement shall be available for a minimum of one year after inspections and tests are completed. The Contractor's gauges and other measuring and testing devices shall be made available for use by the resident inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.</p> <p>Discrepancies noted by the resident inspector during assembly shall be entered by the Contractor's inspection personnel on a record that accompanies the major component, subassembly, assembly, or bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures, or other conditions that cause articles to be in nonconformity with the requirements of the contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, the Procuring Agency shall approve the modification, repair, or method of correction to the extent that the contract specifications are affected.</p>		

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	<p>The primary resident inspector shall remain in the Contractor's plant for the duration of bus assembly work under this contract. Only the primary resident inspector or designee shall be authorized to release the buses for delivery. The resident inspectors shall be authorized to approve the pre-delivery acceptance tests. Upon request to the quality assurance supervisors, the resident inspectors shall have access to the Contractor's quality assurance files related to this procurement. These files shall include drawings, assembly procedures, material standards, parts lists, inspection processing and reports, and records of defects.</p>		
<p>2.6 Support Provision</p>	<p>The Contractor shall provide office space for the resident inspectors in close proximity to the final assembly area. This office space shall be equipped with desks, outside and interplant telephones, file cabinet, chairs, and clothing lockers sufficient to accommodate the resident staff.</p>		
<p>2.7 Acceptance Test</p>	<p>Fully documented tests shall be conducted on each production bus following manufacture to determine its acceptance to the Procuring Agency. These acceptance tests shall include pre-delivery inspections and testing by the Contractor and inspections and testing by the Procuring Agency after the buses have been delivered.</p>		
<p>2.8 Pre-Delivery Test</p>	<p>The Contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to the Procuring Agency. These pre-delivery tests shall include visual and measured inspections, as well as testing the total bus operation. The tests shall be conducted and documented in accordance with written test plans, approved by the Procuring Agency.</p> <p>Additional tests may be conducted at the Contractor's discretion to ensure that the completed buses have attained the desired quality and have met the requirements in "Technical Specifications". The Procuring Agency may, prior to commencement of production, demand that the Contractor demonstrate compliance with any requirement in "Technical Specifications", if there is evidence that prior tests have been invalidated by Contractor's change of supplier or change in manufacturing process. Such demonstration shall be by actual test or by supplying a report of a previously performed test on similar or like components and configuration. Any additional testing shall be recorded on appropriate test forms provided by the Contractor and shall be conducted before acceptance of the bus.</p> <p>The pre-delivery tests shall be scheduled and conducted with thirty (30) days notice so that they may be witnessed by the resident inspectors, who may accept or reject the results of the tests. The results of pre-delivery tests, and any other tests, shall be filed with the assembly inspection records for each bus. The under floor equipment shall be available for inspection by the resident inspectors, using a pit or bus hoist provided by the Contractor. A hoist, scaffold, or elevated platform shall be provided by the Contractor to easily and safely inspect bus roofs. Delivery of each bus shall require written authorization of the primary resident inspector. Authorization forms for the release of each bus for delivery shall be provided by the Contractor. An executed copy of the authorization shall accompany the delivery of each bus.</p>		
<p>2.9 Inspection –Visual & Measure</p>	<p>Visual and measured inspections shall be conducted with the bus in a static condition. The purpose of the inspection testing is to verify overall dimensional and weight requirements, to verify that required components are included and are ready for operation, and to verify that components and subsystems that are designed to operate with the bus in a static condition</p>		

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	do function as designed.		
2.10 Total Bus Operation	<p>Total bus operation shall be evaluated during road tests. The purpose of the road tests is to observe and verify the operation of the bus as a system and to verify the functional operation of the subsystems that can be operated only while the bus is in motion.</p> <p>Each bus shall be driven for a minimum of fifteen (15) miles during the road tests. Observed Defects shall be recorded on the test forms. The bus shall be retested when Defects are corrected and adjustments are made. This process shall continue until Defects or required adjustments are no longer detected. Results shall be pass/fail for these bus operation tests.</p>		
2.11 Post-Delivery Test	<p>The Procuring Agency may conduct acceptance tests on each delivered bus. These tests shall be completed within fifteen (15) days after bus delivery and shall be conducted in accordance with written test plans. The purpose of these tests is to identify Defects that have become apparent between the time of bus release and delivery to the Procuring Agency. The post-delivery tests shall include visual inspection and bus operations. No post-delivery test shall apply criteria that are different from the criteria applied in an analogous pre-delivery test (if any).</p> <p>Buses that fail to pass the post-delivery tests are subject to non acceptance. The Procuring Agency shall record details of all Defects on the appropriate test forms and shall notify the Contractor of acceptance, conditional acceptance, or non acceptance of each bus within five days according to "Acceptance of Bus" after completion of the tests. The Defects detected during these tests shall be repaired according to Attachment E.</p>		
2.12 Visual Inspection	The post-delivery inspection is similar to the inspection at the Contractor's plant and shall be conducted with the bus in a static condition. Any visual delivery damage shall be identified and recorded during the visual inspection of each bus.		
2.13 Bus Operation	Road tests will be used for total bus operation similar to those conducted at the Contractor's plant. In addition, the Procuring Agency may elect to perform chassis dynamometer tests. Operational deficiencies of each bus shall be identified and recorded.		
2.14 New Bus Manufacturing Inspection Guidelines	<p>This attachment was developed by the American Public Transit Association (APTA) Bus Equipment and Maintenance Committee and is intended as a Guideline for use by transit systems (Procuring Agency) and vehicle manufacturers (Contractors).</p> <p>Two lists are included to reflect the expectations of both the transit system and the vehicle manufacturer. See Attachment "F"</p>		
2.15	Warranty Requirement – Basic Provision		
	Warranties in this document are in addition to any statutory remedies or warranties imposed on the Contractor. Consistent with this requirement, the Contractor warrants and guarantees to the original Procuring Agency each complete bus, and specific subsystems and components as follows.		
2.16 Complete Bus	The complete bus, propulsion system, components, major subsystems, and body and chassis structure, are warranted to be free from Defects and Related Defects for one year or 50,000 miles, whichever comes first, beginning on the date of acceptance, or conditional acceptance of each bus under "Acceptance of Bus". The warranty is based on regular		

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	<p>operation of the bus under the operating conditions prevailing in the Procuring Agency's locale.</p> <p>Body, body structure, and structural elements of the suspension are warranted to be free from Defects, Related Defects, and to maintain structural integrity for three years or 150,000 miles, whichever comes first.</p> <p>Primary load carrying members of the bus structure, including structural elements of the suspension, are warranted against corrosion failure and/or fatigue failure sufficient to cause a Class 1 or Class 2 failure for a period of twelve (12) years or 500,000 miles, whichever comes first.</p>		
2.17 Propulsion System	<p>Propulsion system components, specifically the engine, transmission and drive and non-drive axles shall be warranted to be free from Defects and Related Defects for five years or 300,000 miles, whichever comes first. Propulsion system manufacturer's standard warranty, delineating items excluded from this warranty.</p>		
2.18 Major Subsystems	<p>Major subsystems shall be warranted to be free from Defects and Related Defects, for three years or 150,000 miles, whichever comes first. Major subsystem manufacturer's standard warranty. Items included as Major Subsystems are listed below:</p> <ul style="list-style-type: none"> Brake system Destination signs Heating, Ventilating, and Air conditioning system Door systems Air compressor and dryer Wheelchair lift and ramp system Starter Alternator 		
2.19 Extension of Warranty	<p>If, during the warranty period, repairs or modifications on any bus, made necessary by defective design, materials or workmanship are not completed due to lack of material or inability to provide the proper repair for thirty (30) calendar days, the applicable warranty period shall be extended by the number of days equal to the delay period.</p>		
2.20 Voiding of Warranty	<p>The warranties shall not apply to the failure of any part or component of the bus that directly results from misuse, negligence, accident, or repairs not conducted in accordance with the Contractor provided maintenance manuals and with workmanship performed by adequately trained personnel in accordance with recognized standards of the industry. The warranty shall also be void if the Procuring Agency fails to conduct normal inspections and scheduled preventive maintenance procedures as recommended in the Contractor's maintenance manuals and that omission caused the part or component failure. Procuring Agency shall maintain documentation, auditable by the Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.</p>		
2.21 Exception and Additions to Warranty	<p>The warranties shall not apply to scheduled maintenance items, normal wear-out items, and items furnished by the Procuring Agency, except insofar as such equipment may be damaged by the failure of a part or component for which the Contractor is responsible.</p> <p>The warranties shall not apply to components and major subsystems specified by the</p>		

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	<p>Procuring Agency, and required by the Procuring Agency to be installed on the bus by the Contractor, if the following conditions apply: the component or major subsystem supplier declines to participate in this warranty; and the Contractor notifies the Procuring Agency in writing with, or before submitting, Contractor's original Offer. The Contractor shall pass on to the Procuring Agency any warranty, offered by a component supplier, that is superior to that required herein.</p>		
<p>2.22 Detection of Defects</p>	<p>If the Procuring Agency detects a Defect within the warranty periods defined in "Warranty Requirements", it shall within twenty (20) working days, notify the Contractor's representative. Within five (5) working days after receipt of notification, the Contractor's representative shall either agree that the Defect is in fact covered by warranty, or reserve judgment until the subsystem or component is inspected by the Contractor's representative or is removed and examined at the Procuring Agency's property or at the Contractor's plant. At that time, the status of warranty coverage on the subsystem or component shall be mutually resolved between the Procuring Agency and the Contractor. Work shall commence to correct the Defect within ten (10) working days after receipt of notification and shall be conducted in accordance with "Repairs by Contractor".</p>		
<p>2.23 Scope of Warranty Repairs</p>	<p>When warranty repairs are required, the Procuring Agency and the Contractor's representative shall agree within five (5) working days after notification on the most appropriate course for the repairs and the exact scope of the repairs to be performed under the warranty. If no agreement is obtained within the five-day period, the Procuring Agency reserves the right to commence the repairs in accordance with "Repairs by Procuring Agency".</p>		
<p>2.24 Fleet Defects</p>	<p>OCCURRENCE AND REMEDY</p> <p>A fleet defect is defined as cumulative failures of any kind in the same components in the same or similar application where such items covered by the warranty and such failures occur in the warranty period in the specified proportion of the buses delivered under this contract.</p> <p>The Contractor shall correct a fleet defect under the warranty provisions. After correcting the Defect, the Procuring Agency and the Contractor shall mutually agree to and the Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Defect in all other buses and spare parts purchased under this contract. Where the specific Defect can be solely attributed to particular identifiable part(s), the work program shall include redesign and/or replacement of only the defectively designed and/or manufactured part(s). In all other cases, the work program shall include inspection and/or correction of all of the buses in the fleet via a mutually agreed to arrangement.</p> <p>EXCEPTIONS TO FLEET DEFECT PROVISIONS</p> <p>The fleet defect warranty provisions shall not apply to Procuring Agency-supplied items such as fare boxes, radio and fare collection equipment, communication systems, and tires.</p> <p>Fleet defect warranty provisions shall not apply to components and major subsystems</p>		

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	specified by the Procuring Agency and required by the Procuring Agency to be installed on the bus by the Contractor, if the following conditions apply: the component or major subsystem supplier declines to participate in this warranty; and the Contractor notifies the Procuring Agency in writing with, or before submitting, Contractor's original Offer. The Contractor shall pass on to the Procuring Agency any warranty, offered by a component supplier, that is superior to that required herein.		
	Repair Procedures		
2.25 Repair Procedures	The Contractor is responsible for all warranty-covered repair work. To the extent practicable, the Procuring Agency will allow the Contractor or its designated representative to perform such work. At its discretion, the Procuring Agency may perform such work if it determines it needs to do so base on transit service or other requirements. Such work shall be reimbursed by the Contractor.		
2.26 Repair by Contactor	<p>The Contractor or its designated representative shall begin work on warranty-covered repairs, within five (5) calendar days after receiving notification of a Defect from the Procuring Agency. The Procuring Agency shall make the bus available to complete repairs timely with the Contractor repair schedule.</p> <p>The Contractor shall provide at its own expense all spare parts, tools, and space required to complete repairs. At the Procuring Agency's option, the Contractor may be required to remove the bus from the Procuring Agency's property while repairs are being performed. If the bus is removed from the Procuring Agency's property, repair procedures must be diligently pursued by the Contractor's representative.</p>		
2.27 Parts Used	If the Procuring Agency performs the warranty-covered repairs, it shall correct or repair the Defect and any Related Defects utilizing parts supplied by the Contractor specifically for this repair. At its discretion, the Procuring Agency may use Contractor-specified parts available from its own stock if deemed in its best interest. Monthly, or at a period to be mutually agreed upon, reports of all repairs covered by this warranty shall be submitted by the Procuring Agency to the Contractor for reimbursement or replacement of parts. The Contractor shall provide forms for these reports.		
2.28 Contractor Supplied Parts	The Procuring Agency may require that the Contractor supply new parts for warranty-covered repairs being performed by the Procuring Agency. These parts shall be shipped prepaid to the Procuring Agency from any source selected by the Contractor within ten (10) working days of receipt of the request for said parts. Parts supplied by the Contractor shall be Original Equipment Supplier (OEM) equivalent or superior to that used in the bus original manufacture.		
2.29 Defective Components NTS Return	The Contractor may request that parts covered by the warranty be returned to the manufacturing plant. The total cost for this action shall be paid by the Contractor. Materials should be returned in accordance with Contractor's instructions.		
2.30 Failure Analysis	The Contractor shall, upon specific request of the Procuring Agency, provide a failure analysis of fleet defect- or safety-related parts, or major components, removed from buses		

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	under the terms of the warranty, that could affect fleet operation. Such reports shall be delivered within sixty (60) days of the receipt of failed parts.		
2.31 Reimbursement For Labor	The Procuring Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by multiplying the number of man-hours actually required to correct the Defect by a per hour, 5M mechanic, straight wage rate, as defined in "Technical Specifications", plus the cost of towing in the bus if such action was necessary and if the bus was in the normal service area.		
2.32 Reimburse For Parts	The Procuring Agency shall be reimbursed by the Contractor for defective parts and for parts that must be replaced to correct the Defect. The reimbursement shall be at the current price at the time of repair and shall exclude taxes.		
2.33 Reimbursement Requirements	The Contractor shall reimburse the Procuring Agency for warranty labor and/or parts within sixty (60) days of receipt of warranty claim.		
2.34 Warranty After Replacement Parts	<p>If any component, unit, or subsystem is repaired, rebuilt or replaced by the Contractor or by the Procuring Agency with the concurrence of the Contractor, the component, unit, or subsystem shall have the unexpired warranty period of the original. Repairs shall not be warranted if Contractor-provided or authorized parts are not used for the repair; unless the Contractor has failed to respond within five (5) days, in accordance with "Scope of Warranty Repairs".</p> <p>The warranty on items determined to be fleet defects as described herein shall be extended for the time and/or miles of the original warranty remaining at the time the fleet defect was identified. This extended warranty shall begin on the repair/replacement date for corrected items on each bus.</p>		
	SCOPE		
2.35 Scope	<p>These Technical Specifications cover requirements for Low Floor Heavy Duty Diesel Transit coaches which may be used for rural and urban transit service operations on urban streets and rural roadways in the general environmental and climatic conditions prevailing throughout COMMONWEALTH OF VIRGINIA operating area. It shall have a minimum expected life of 12 years or 500,000 miles, whichever comes first, and is intended for the widest possible spectrum of adult passengers, elderly, and persons with disabilities. All vehicles in this procurement shall be of the low floor design with front door wheelchair ramp systems.</p> <p>It is the intent of this specification to describe the design requirements for a Heavy Duty Diesel Transit coach rugged enough to withstand rigorous intensive daily transit service operations and provide maximum reliability and availability, with a minimum of maintenance and repair time. The coach shall exhibit maximum passenger appeal in appearance, comfort and safety, combined with excellence in reliability, operating characteristics, efficiency, and economy of operation.</p> <p>The coach shall be fully compliant with the applicable requirements of the Americans with Disabilities Act (ADA) and any revisions published by the Architectural and Transportation Barriers Compliance Board or The Federal Transit Administration for fixed route operations.</p>		

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	Where these specifications exceed the requirements of ADA, the specification requirement shall apply.				
	Included in this specification is the description for low floor 30, 35 and 40-foot heavy-duty transit coaches.				
2.36 Low Floor Coach	40 foot bus	35 foot bus	30 foot bus		
	Length:	40' 10" max	35' 10" max	30' 10" max	
	Width:	102 inches +0, -1	102 inches +0, -1	102 inches +0, -1	
	Height: with no equipment on roof	111.0 inches	111.0 inches	111.0 inches	
	Seating Capacity:	39	32	25	
	Floor Height:	16 inches	16 inches	16 inches	
	Front Step Height: kneeled	14.5 inches	14.5 inches	14.5 inches	
	Head Room Minimum:	78" front; 74" rear	78" front; 74" rear	78" front; 74" rear	
	Aisle Width Minimum:	25 inches	25 inches	25 inches	
	Wheel Base:	293 inches	228.3 inches	171 inches	
	Turning Radius (front body corner) maximum:	44'	39'	34'	
	Approach Angle:	9°	9°	9°	
	Departure Angle:	9°	9°	9°	
	Curb Weight Max. GVW:	32,000 lbs.	32,000 lbs.	32,000 lbs.	
Vehicle Weight Max. GVWR:	41,000 lbs.	41,000 lbs.	41,000 lbs.		
2.37 Definition	<p>The following are definitions of special terms used in Part 5.</p> <p>(1) Ambient Temperature. The temperature of the surrounding air. For testing purposes, ambient temperature must be between (0.0° F) and (+110° F).</p> <p>(2) dBA. Decibels with reference to 0.0002 microbar as measured on the "A" scale.</p> <p>(3) Audible Discrete Frequency. An audible discrete frequency is determined to exist if the sound power level in any 1/3-octave band exceeds the average of the sound power levels of the two adjacent 1/3-octave bands by 4 decibels (dB) or more.</p> <p>(4) Battery Management System (BMS)-High Voltage. Monitors energy, as well as temperature, (direct measurement and/or calculated value) individual cell or module voltages, and total pack voltage. The BMS adjusts the control strategy algorithms to maintain the batteries at uniform state of charge and optimal temperatures. BSM data shall be available in J1939 format.</p> <p>(3) Standee Line. A line marked across the bus aisle in line with the driver's barrier to designate the forward area that passengers may not occupy when the bus is moving.</p>				

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	<p>(4) <u>Free Floor Space</u>. Floor area available to standees, excluding the area under seats, area occupied by feet of seated passengers, the vestibule area forward of the standee line, and any floor space indicated by manufacturer as non-standee areas such as, the floor space "swept" by passenger doors during operation. Floor area of 1.5 square feet shall be allocated for the feet of each seated passenger.</p> <p>(5) <u>Curb Weight</u>. Weight of vehicle, including maximum fuel, oil and coolant; and all equipment required for operation and required by this Specification, but without passengers or operator.</p> <p>(6) <u>Seated Load</u>. One hundred fifty pounds for every designed passenger seating position and for the operator.</p> <p>(7) <u>Gross Load</u>. One hundred fifty pounds for every designed passenger seating position, for the operator, and for each 1.5 square feet of free floor space.</p> <p>(8) <u>SLW (Seated Load Weight)</u>. Curb weight plus seated load.</p> <p>(9) <u>GVW (Gross Vehicle Weight)</u>. Curb weight plus gross load.</p> <p>(10) <u>GVWR (Gross Vehicle Weight Rated)</u>. The maximum total weight, as determined by the vehicle manufacturer, at which the vehicle can be safely and reliably operated for its intended purpose.</p> <p>(11) <u>GAWR (Gross Axle Weight Rated)</u>. The maximum total weight as determined by the axle manufacturer, at which the axle can be safely and reliably operated for its intended purpose.</p> <p>(12) <u>Heavy Heavy-Duty Diesel Engine (HHDD)</u>. Heavy heavy-duty diesel engines have sleeved cylinder liners, are designed for multiple rebuilds, and a rated horsepower that generally exceeds 250.</p> <p>(13) <u>Operator's Eye Range</u>. The 95th-percentile ellipse defined in SAE Recommended Practice J941, except that the height of the ellipse shall be determined from the seat at its reference height.</p> <p>(14) <u>Fireproof</u>. Materials that will not burn or melt at temperatures less than 2,000° F.</p> <p>(15) <u>Fire-Resistant</u>. Materials that have a flame spread index less than 150 as measured in a radiant panel flame test per ASTM-E 162-90.</p> <p>(16) <u>Human Dimensions</u>. The human dimensions used in Part 5: Technical Specifications are defined in SAE Recommended Practice J833.</p> <p>(17) <u>HIC (Head Injury Criteria)</u>. The following equation presents the definition of head</p>		
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injury criteria:

$$\left[\frac{1}{t_1 - t_2} \int_{t_2}^{t_1} (a) dt \right]^{2.5} (t_2 - t_1)$$

where:

a = the resultant acceleration at the center of gravity of the head form expressed as a multiple of g, the acceleration of gravity.

t₁ and t₂ = any two points in time during the impact.

(18) Baseline Configuration Bus. The bus described by Part 5: Technical Specifications if no alternatives are selected. Signing, colors, the destination sign reading list and other information must be provided by the Procuring Agency in attachments to Part 5: Technical Specifications.

(19) Alternative. An alternative specification condition to the standard configuration bus. The Procuring Agency may define alternatives to the standard configuration to satisfy local operating requirements. Alternatives for the standard configuration will be clearly identified.

(20) Design Operating Profile. The operating profile for design purposes shall consist of simulated transit type service. The duty cycle is described in the figure "Transit Coach Duty Cycle." The duty cycle consists of three phases to be repeated in sequence: a central business district (CBD) phase of 2 miles with 7 stops per mile and a top speed of 20 mph, an arterial route phase of 2 miles with 2 stops per mile and a top speed of 40 mph, and a commuter phase of 4 miles with 1 stop and a maximum speed of 55 mph and a 5 minute idle phase.

Phase	Stops/ Mile	Top Speed	Mil es	Acc el. Dist .	Acc el. Tim e	Cruis e Dist.	Cruis e Tim e	Decel . Rate	Dec el. Dist.	Dec el. Time	Dwe ll Tim e	Cycle Time	Tota l Stop s
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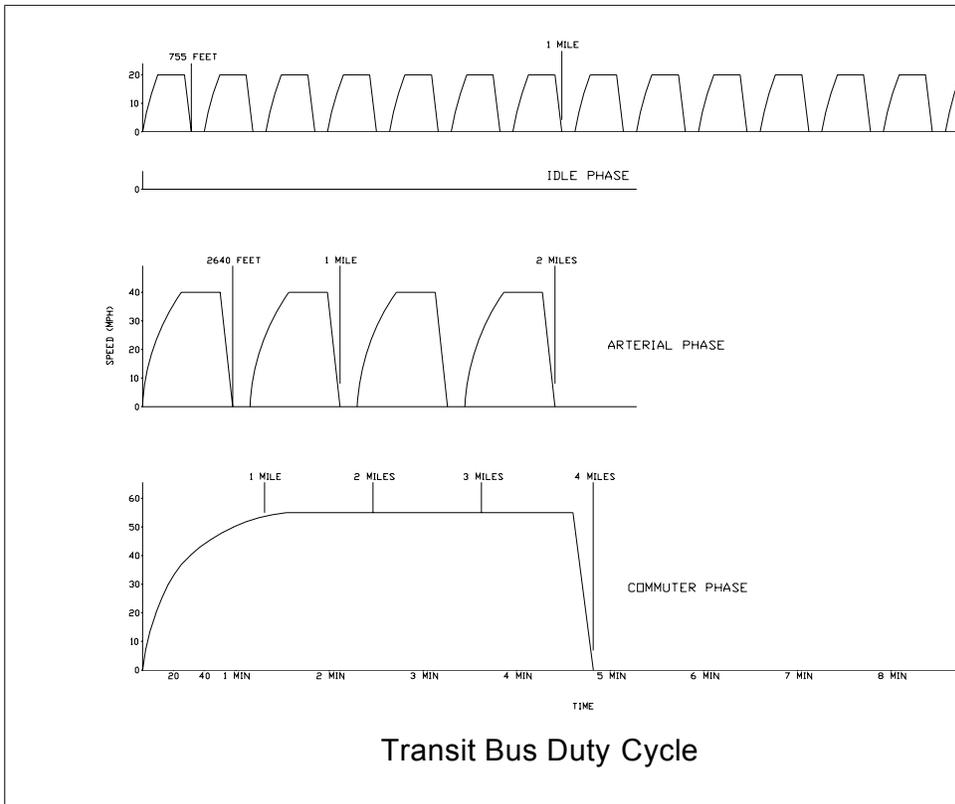
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		(mph)	(ft.)	(s)	(ft.)	(s)	(fspsp s)	(ft.)	(s)	(s)	(min-s)		
CBD	7	20	2	155	10	540	18.5	6.78	60	4.5	7	9-20	14
Idle	-	-	-	-	-	-	-	-	-	-	-	5-0	-
Arteria	2	40	2	1035	29	1350	22.5	6.78	255	9	7	4-30	4
CBD	7	20	2	155	10	510	18.5	6.78	60	4.5	7	9-20	14
Arteria	2	40	2	1035	35	1350	22.5	6.78	255	9	7	4-30	4
CBD	7	20	2	155	10	510	18.5	6.78	60	4.5	7	9-20	14
Commuter	1 stop for phase	Max. or 55	4	5500	90	2 miles + 4580 ft.	188	6.78	480	12	20	5-10	1
Total			14									47-10	51

Average Speed - 17.8 mph



The bus shall be loaded to SLW and shall average approximately 18 mph while operating on this duty cycle. Operation shall continue regardless of the ambient temperature or weather conditions. The passenger doors shall be opened and

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closed at each stop, and the bus shall be knelt at each stop during the CBD phase.

The braking profile shall be:

- 16 percent of the stops at 3 ft/sec/sec
- 50 percent of the stops at 6 ft/sec/sec
- 26 percent of the stops at 9 ft/sec/sec
- 8 percent of the stops at 12 ft/sec/sec

These percentages of stops shall be evenly distributed over the three phases of the duty cycle. For scheduling purposes, the average deceleration rate is assumed.

(21) Classes of Failures. Classes of failures are described below.

- a. Class 1: Physical Safety. A failure that could lead directly to passenger or operator injury or represents a severe crash situation.
- b. Class 2: Road Call. A failure resulting in an en route interruption of revenue service. Service is discontinued until the bus is replaced or repaired at the point of failure.
- c. Class 3: Bus Change. A failure that requires removal of the bus from service during its assignments. The bus is operable to a rendezvous point with a replacement bus.
- d. Class 4: Bad Order. A failure that does not require removal of the bus from service during its assignments but does degrade bus operation. The failure shall be reported by operating personnel.

(22) Maintenance Personnel Skill Levels. Defined below are maintenance personnel skill levels used in Part 5: Technical Specifications.

- a. 5M: Specialist Mechanic or Class A Mechanic Leader
- b. 4M: Journeyman or Class A Mechanic
- c. 3M: Service Mechanic or Class B Servicer
- d. 2M: Mechanic Helper or Bus Servicer
- e. 1M: Cleaner, Fueller, Oiler, Hostler, or Shifter

Note: Whenever a specific time is indicated to access components or complete a task, it is assumed the vehicle is in the location where the work is to be performed. All necessary equipment is in its correct position (tools, jacks, vehicle lifts, lighting, fluid recovery systems, etc.) and ready for use.

(23) Standards. Standards referenced in Part 5: Technical Specifications are the latest revisions unless otherwise stated.

(24) Wheelchair. A mobility aid belonging to any class of three or four-wheeled

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	<p>devices, usable indoors, designed for and used by individuals with mobility impairments, whether operated manually or powered. A "common wheelchair" is such a device that does not exceed 30 inches in width and 48 inches in length measured two inches above the ground, and does not weigh more than 600 pounds when occupied.</p> <p>(25) <u>Structure</u>. The structure shall be defined as the basic body, including load bearing external panels, structural components, axle mounting provisions and suspension beams and attachment points.</p> <p>(26) <u>Low Floor Bus</u>. A bus which, between at least the front (entrance) and rear (exit) doors, has a floor sufficiently low and level so as to remove the need for steps in the aisle between the doors and in the vicinity of these doors.</p>		
<p>2.38 Abbreviations</p>	<p>The following is a list of abbreviations used in Part 5: Technical Specifications.</p> <p>(1) <u>ADA</u> Americans with Disabilities Act</p> <p>(2) <u>ANSI</u> American National Standards Institute</p> <p>(3) <u>ASHRAE</u> American Society of Heating, Refrigerating and Air Conditioning Engineers</p> <p>(4) <u>ASTM</u> American Society for Testing and Materials</p> <p>(5) <u>EMI</u> Electromagnetic Interference</p> <p>(6) <u>EPA</u> Environmental Protection Agency</p> <p>(7) <u>FMCSR</u> Federal Motor Carrier Safety Regulations</p> <p>(8) <u>FMVSS</u> Federal Motor Vehicle Safety Standards</p> <p>(9) <u>FTA</u> Federal Transit Administration</p> <p>(10) <u>I/O</u> Input/Output</p> <p>(11) <u>ISO</u> International Organization for Standardization</p> <p>(12) <u>JIC</u> Joint Industrial Council</p> <p>(13) <u>LED</u> Light Emitting Diode</p> <p>(14) <u>NHTSA</u> National Highway Traffic Safety Administration</p> <p>(15) <u>OSHA</u> Occupational Safety and Health Administration</p> <p>(16) <u>RFI</u> Radio Frequency Interference</p>		

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	<p>(17) <u>SAE</u> Society of Automotive Engineers International</p> <p>(18) <u>SPI</u> Society of the Plastics Industry</p> <p>(19) <u>UL</u> Underwriters Laboratories</p> <p>(20) <u>ULSD</u> Ultra-Low Sulfur Diesel Fuel</p> <p>(21) <u>USDOT</u> United States Department of Transportation</p>		
<p>2.39 Legal Requirements</p>	<p>The contractor shall comply with all applicable Federal, state and local regulations. These shall include, but not be limited to, Federal ADA as well as state and local accessibility, safety and security requirements. Local regulations are defined as those below the state level.</p> <p>The bus shall meet all applicable FMVSS and shall accommodate all applicable FMCSR regulations in effect at the date of manufacture.</p> <p>In the event of any conflict between the requirements of this Specification and any applicable legal requirement, the legal requirement shall prevail. Technical requirements that exceed the legal requirements are not considered to conflict.</p>		
<p>2.40 Overall Requirements</p>	<p>The contractor shall ensure that the application and installation of major bus subcomponents and systems are compliant with all such subcomponent vendors' requirements and recommendations. Components used in the vehicle shall be of heavy duty design and proven in transit service.</p> <p>a. Coaches are to be used in urban areas, but at the same time must be able to maintain speeds up to 65 MPH for relatively long distances between stops. Coaches shall be able to maintain a minimum of 7 MPH on a fifteen percent (15%) grade when loaded to GVWR.</p> <p>b. Coaches shall incorporate features essential for safe, fast, efficient and comfortable operation by the operator, features that ensure excellent road and traffic visibility under all driving conditions and adequate means for safe passenger movement. The coach shall be made capable of easy maneuvering in normal and heavy traffic.</p>		
<p>2.41 Dimensions</p>	<p>Physical Size With the exceptions of exterior mirrors, marker and signal lights, bumpers, fender skirts, washers and wipers, the bus shall have the following overall dimensions as shown in the figure "Transit Coach Exterior Dimensions" at static conditions and design height.</p> <p>40-foot bus:</p> <p>(1) Body Length: 40 feet (+10 inches, -0)</p> <p>(2) Body Width: 102 inches (+0, -1 inch)</p> <p>(3) Maximum Overall Height: 132 inches, includes all rigid roof mounted items such as A/C, exhaust, etc.</p> <p>35-foot bus:</p>		

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	<p>(1) Body Length: 35 feet (+10 inches, -0)</p> <p>(2) Body Width: 102 inches (+0, -1 inch)</p> <p>(3) Maximum Overall Height: 132 inches, includes all rigid roof mounted items such as A/C, exhaust, etc.</p> <p>30-foot bus:</p> <p>(1) Body Length: 30 feet (+10 inches, -0)</p> <p>(2) Body Width: 102 inches (+0, -1 inch)</p> <p>(3) Maximum Overall Height: 132 inches, includes all rigid roof mounted items such as A/C, exhaust, etc.</p> <p>See Attachment G</p>		
<p>2.42</p> <p>Underbody Clearance</p>	<p>Underbody Clearance The bus shall maintain the minimum clearance dimensions as shown in the figure "Transit Bus Minimum Road Clearance" and defined in SAE Standard J689, regardless of load up to the gross vehicle weight rating.</p> <p><u>Ramp Clearances.</u> Approach angle shall be no less than 8.75 degrees. Breakover angle shall be no less than 8.5 degrees. Departure angle shall be no less than 8.75 degrees.</p> <p>The approach angle is the angle measured between a line tangent to the front tire static loaded radius arc and the initial point of structural interference forward of the front tire to the ground.</p> <p>The departure angle is the angle measured between a line tangent to the rear tire static loaded radius arc and the initial point of structural interference rearward of the rear tire to the ground.</p> <p>The breakover angle is the angle measured between two lines tangent to the front and rear tire static loaded radius and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll.</p> <p><u>Ground Clearance.</u> Ground clearance shall be no less than 10 inches, except within the axle zone and wheel area.</p> <p><u>Axle Clearance.</u> Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5½ inches.</p> <p><u>Wheel Area Clearance.</u> Wheel area clearance, shall be no less than 8 inches for parts fixed to the bus body and 6 inches for parts that move vertically with the axles.</p>		
<p>2.43</p> <p>Floor Height</p>	<p>Height of the floor above the street shall be no more than 15.5 ± 0.2 inches measured at the centerline of the front and rear doorway. The floor may be inclined along the longitudinal axis of the bus, and the incline shall be less than 2 degrees off the horizontal except locally at the doors where 2 degree slope toward the door is allowed. All floor measurements shall be with the bus at the design height and on a level surface and with the standard 305 transit tires.</p>		

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<p>2.44 Interior Headroom</p>	<p>Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 inches in the forward half of the bus tapering to no less than 74 inches forward of the rear settee. At the centerline of the window seats, headroom shall be no lower than 65 inches. Headroom at the back of the rear bench seat may be reduced to a minimum of 56 inches, but it shall increase to the normal ceiling height at the front of the seat cushion. In any area of the bus directly over the head of a seated passenger and positioned where a passenger entering or leaving the seat is prone to strike his/her head, padding shall be provided on the overhead paneling.</p>		
<p>2.45 Weight</p>	<p>Curb weight of the bus, as defined in Section 5.1.1 of these Specifications, shall be minimized to the extent practical without compromising its integrity and durability and shall not exceed 32,000 pounds for 30', 35' and 40' buses, and 43,700 for 60' buses.</p>		
<p>2.46 Capacity</p>	<p>The vehicle shall be designed to carry the Gross Vehicle Weight as defined in Section 5.1.1, which shall not exceed the bus GVWR.</p>		
<p>2.47 Service Life & Maintenance</p>	<p>Service Life The bus shall be designed to operate in transit service for at least 12 years or 500,000 miles. It shall be capable of operating at least 40,000 miles per year including the twelfth year.</p>		
<p>2.48 Maintenance and Inspection</p>	<p>Prime consideration shall be given to the routine problems of maintaining the buses. All bus components and systems, which may require repair or inspection, shall be installed so that a minimum amount of time is consumed in gaining access to them. It shall not be necessary to disassemble portions of the bus structure and/or equipment, such as seats and flooring, in order to gain access to these areas.</p> <p>Each bus shall be designed to facilitate the disassembly, reassembly, servicing or maintenance thereof by use of tools and items which are normally available as commercially standard items. Requirement of any special tools must have approval of Procuring Agency and shall be supplied by the Contractor.</p> <p>The body and structure of all buses shall be designed for ease of maintenance and repair. Individual panels or other equipment which may be damaged in normal service shall be repairable or replaceable. It shall be the design goal of the Contractor to minimize the labor-hours required to perform the most frequent repairs and service items listed in this Specification. It shall also be a design goal to minimize the frequency of repair, adjustment, lubrication, and/or inspection of normal maintenance items.</p> <p>Scheduled maintenance or inspection tasks as specified by the Contractor shall require a skill level of 3M or less. Scheduled maintenance tasks shall be related and shall be grouped in maximum mileage intervals. Routine scheduled maintenance actions, such as filter replacement and adjustments, shall not be required at intervals of less than 6,000 miles, except for routine daily service performed during the fueling operations.</p> <p>Higher levels of scheduled maintenance tasks shall occur at even multiples of mileage for lower level tasks. All bolts, bars, screws, clamps, nuts, or other fasteners should not require torque or adjustments at intervals of less than 50,000 miles.</p> <p>Any special tools required to maintain the bus shall be provided in quantities as specified.</p>		

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	<p>Test ports shall be provided for commonly checked functions on the bus such as air intake, exhaust, hydraulic, pneumatic, charge-air and engine cooling systems.</p> <p>The Contractor shall provide a manual listing the times required for typical repair and service items on the bus.</p>		
<p>2.49 Accessibility</p>	<p>All systems or components subject to periodic maintenance or that are subject to periodic failures shall be readily accessible for service and inspection. To the extent practicable, removal or physical movement of components unrelated to the specific maintenance and/or repair tasks involved shall be unnecessary.</p> <p>As a goal, relative accessibility of components, measured in time required to gain access, shall be inversely proportional to frequency of maintenance and repair of the components. Specific maintainability requirements are defined in other sections of Part 5: Technical Specifications.</p>		
<p>2.50 Interchangeability</p>	<p>Components with identical functions shall be interchangeable to the extent practicable. These components shall include, but not be limited to; front and rear suspension systems, power train components, e.g., engine, propulsion system, HVAC, passenger window hardware, interior trim, lamps, lamp lenses, doors, and seat assemblies. Components with non-identical functions shall not be, or appear to be, interchangeable. A component shall not be used in an application for which it was neither designed nor intended.</p> <p>Locations for components, sub-assemblies, hatches, windows and doors shall be identical between buses, unless otherwise approved by the Procuring Agency. Standardization of parts and direct interchangeability shall be maintained throughout the entire production order.</p>		
<p>2.51 Operating Environment</p>	<p>The bus shall achieve normal operation in ambient temperature ranges of -10° to 115° F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 5,000 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below -10° F, above 115°F, or at altitudes above 5,000 feet.</p> <p>Special equipment or procedures may be employed to start the bus after being exposed for more than 12 hours to temperatures less than 30° F without the engine in operation. Speed, gradability, and acceleration performance requirements shall be met at, or corrected to, 85°F, 29.31 inches Hg, dry air. Performance degradation at conditions other than the test standard shall not exceed 1% for each 3 degrees F, or 4% for each 1,000 feet of altitude above the standard. The interior climate control system shall perform in accordance with Section 5 of the Technical Specifications.</p>		
<p>2.52 Interior Noise</p>	<p>Interior Noise The combination of inner and outer panels and any material used between them shall provide sufficient sound insulation so that a sound source with a level of 80 dBA measured at the outside skin of the bus shall have a sound level of 65 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the engine and accessories switched off.</p>		

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	<p>The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 80 dBA and the operator shall not experience a noise level of more than 75 dBA under the following test conditions. The bus shall be empty except for test personnel, not to exceed 4 persons, and the test equipment. All openings shall be closed and all accessories shall be operating during the test. The bus shall accelerate at full throttle from a standstill to 35 mph on level commercial asphalt or concrete pavement in an area free of large reflecting surfaces within 50 feet of the bus path. During the test, the ambient noise level in the test area shall be at least 10 dBA lower than the bus under test. Instrumentation and other general requirements shall conform to SAE Standard J366. If the noise contains an audible discrete frequency as defined in Section 5.1.2, a penalty of 5 dBA shall be added to the sound level measured.</p>		
2.53 Exterior Noise	<p>Airborne noise generated by the bus and measured from either side shall not exceed 81 dBA under full power acceleration when operated at or below 35 mph at curb weight and just prior to transmission upshift. The maximum noise level generated by the bus pulling away from a stop at full power shall not exceed 81 dBA. The bus-generated noise at curb idle shall not exceed 65 dBA. If the noise contains an audible discrete frequency as defined in Section 5.1.2, a penalty of 5 dBA shall be added to the sound level measured. All noise readings shall be taken 50 feet from, and perpendicular to, the centerline of the bus with all accessories operating. Instrumentation, test sites, and other general requirements shall be in accordance with SAE Standard J366. The pull away test shall begin with the front bumper even with the microphone. The curb idle test shall be conducted with the rear bumper even with the microphone.</p> <p>In addition, the Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the Procuring Agency.</p>		
2.54 Electronic Noise Control	<p>Electrical and electronic subsystems and components on all buses shall not emit electromagnetic radiation that will interfere with on-board or nearby radio communication or violate regulations of the Federal Communication Commission. On-board equipment can include two-way radios, electronic fare collection equipment, automatic vehicle locating devices, electronic trip recorder and video surveillance camera, etc.</p>		
2.55 Engine Emission	<p>All buses shall conform to the air pollution control standards of the Environmental Protection Agency (EPA) of the Federal Government and shall meet air pollution requirements of the State of Virginia. Engines shall be certified to run on Ultra Low Sulfur diesel fuel.</p>		
2.56 Regulator Standard Requirements	<p>All buses shall comply with Federal Motor Vehicle Safety Standards (FMVSS) as established by the United States Department of Transportation. Compliance with this specification does not relieve the Contractor from complying with all applicable Federal, State, local and other requirements and/or standards (e.g., SAE, ASTM, ANSI etc.) or the manufacture, sale or use of such buses.</p>		
2.57 Fire Safety	<p>The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emission regulations. These provisions shall include the use of fire-retardant/low-smoke materials, fire detection systems, firewalls, and facilitation of passenger evacuation.</p> <p>All materials used in the construction of the Passenger Compartment of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90, dated</p>		

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	<p>October 20, 1993. Materials entirely enclosed from the passenger compartment, such as insulation within the sidewalls, need not comply. In addition, smaller components and items, such as seat grabrails, switch knobs and small light lenses, shall be exempt from this requirement.</p> <p>Each bus shall be equipped with the Amerex dry chemical fire suppression system, Model V-25 with remote electronic actuation. Three (3) heat-actuated detectors shall be located in the engine compartment. In case of fire, both visible and audible alarms shall activate in the driver's area. The system shall shut down the engine within fifteen (15) seconds of detecting a fire.</p> <p>The requirements for passenger evacuation provisions related to doors, windows, and escape hatches are defined in Technical Specifications.</p>		
2.58 Elderly & Disabled Passengers	The contractor shall comply with all applicable Federal requirements defined in the Americans with Disabilities Act, 49 CFR Part 38, and all state and local regulations regarding mobility-impaired persons. Local regulations are defined as those below the state level.		
2.59 Respect for Environment	In the design and manufacture of the bus the Contractor shall make every effort to reduce the amount of potentially hazardous waste generated by the Procuring Agency when maintaining the bus in accordance with the procedures contained in the manufacturer's maintenance manuals. The manufacturer shall use, whenever possible, LED lighting, low mercury fluorescent lighting tubes, PCB free ballast units, cleanable filters (unless required otherwise by the Procuring Agency), and non-asbestos brake blocks and gaskets. In accordance with Section 6002 of the Resource Conservation and Recovery Act the Contractor shall use, whenever possible and allowed by the specifications, recycled materials in the manufacture of the bus. Some ESS system components posing an elevated risk to the environment shall meet this requirement; proposers shall submit listing for certified contractors for recycling of these ESS system components. Proposers shall submit recycling cost estimates as part of their technical submission.		
	Vehicle Performance		
2.60 Power Requirements	The propulsion system and drive train shall provide adequate horsepower and torque to enable the bus to meet the defined acceleration, top speed, and gradability requirements, and operate all propulsion-driven accessories at their maximum capacity. Power requirements are based on heavy heavy-duty diesel (HHDD) engines certified for use in all 50 states using actual road test results or computerized vehicle performance data. The propulsion system shall have a design life of at least 12 years or 500,000 miles.		
2.61 Top Speed	The bus shall be capable of a top speed of 65 mph on a straight level road at GVWR with all accessories operating to maximum capacity, and it shall be governed at that top speed.		
2.62 Gradability	Gradability requirements shall be met on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating. The power plant shall enable the bus to maintain a speed of 40 mph on a 2½ percent grade and 7 mph on a 16 percent grade.		
2.63 Acceleration	The acceleration shall meet the requirements below and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement shall commence when the accelerator is depressed - (Idle Start.)		

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	SPEED (MPH)	TIME (SEC)		
	10	5.0		
	20	10.8		
	30	20.0		
	40	31.0		
	50	44.0		
<p>2.64 Operating Range</p>	<p>The operating range of the coach run on the design operating profile shall be at least 350 miles with full fuel capacity.</p>			
<p>2.65 Fuel Economy</p>	<p>The engine shall be tuned when delivered to provide optimized performance as specified above, including fuel economy. All related components and configuration that affect fuel economy, such as, fan control/operation, transmission, axle ratio, etc., shall be selected accordingly. The bus shall achieve an average fuel economy of 4.00 miles per gallon when run on the Transit Coach Duty Cycle loaded to SLW. Reference SAE J1376, Fuel Economy Measurement Test (Engineering Type) for Trucks and Buses</p>			
<p>2.66 Power Plant</p>	<p>Engine The HHDD engine shall be designed to operate for not less than 300,000 miles without major failure or significant deterioration. Components of the fuel injector and/or control system shall be designed to operate for not less than 150,000 miles without replacement or major service. Mileage intervals are based on the design operating profile defined in Section 5.1.2.</p> <p>The engine shall meet all requirements in the Technical Specifications when operating on ultra low sulfur diesel fuel, as certified by the engine manufacturer and specified by the Procuring Agency.</p> <p>The engine shall be equipped with an electronically controlled management system, compatible with multiplex wiring systems and either 12 or 24-volt electrical systems. The engine control system shall be capable of receiving electronic inputs from the engine and other vehicle systems. Communication between these electronic systems shall be made using the SAE J1939 Recommended Practice communication link. The engine's electronic management system shall monitor operating conditions and provide instantaneous adjustments to optimize both engine and bus performance. The system shall be programmable to allow optimization of engine performance.</p> <p>In order to avoid potential warranty disputes during the engine warranty period, initial performance settings shall only be changed with the authorization from the bus and engine manufacturers.</p> <p>The engine shall have on-board diagnostic capabilities, able to monitor vital functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service</p>			

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	<p>personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in operator's area and near or inside engine compartment. The on-board diagnostic system shall inform the operator via visual and/or audible alarms when out-of-parameter conditions exist for vital engine functions. Conditions that require an operator alarm are identified.</p> <p>The engine starter shall be protected by an interlock that prevents its engagement when the engine is running. Special equipment or procedures may be employed to start the engine when exposed to temperatures less than 30° F for a minimum of four hours without the engine in operation. All cold weather starting aids, engine heating devices and procedures shall be of the type recommended by the engine manufacturer and approved by the Procuring Agency.</p> <p>The engine shall be equipped with an operator-controlled fast idle device. The fast idle control shall be a two-way toggle mounted on the dash or side console and shall activate only with the transmission in neutral and the parking brake applied. This device may be used to help meet the requirements of bus cool down.</p> <p>The engine control system shall protect the engine against progressive damage. The system shall monitor conditions critical for safe operation and automatically derate power and/or speed and initiate engine shutdown as needed. The on-board diagnostic system, as described shall trigger a visual and audible alarm to the operator when the engine control unit detects a malfunction and the engine protection system is activated.</p> <p>Automatic shutdown shall only occur when parameters established for the functions below are exceeded:</p> <ul style="list-style-type: none"> Coolant Level Coolant Temperature Oil Pressure Oil Temperature <p>A control shall be available to the operator, to allow temporary override (30-45 seconds) of the engine protection/shutdown system if engine power is required to move the bus in emergency conditions.</p>		
<p>2.67 Cooling Systems</p>	<p>The cooling systems shall be of sufficient size to maintain all engine and transmission fluids and engine intake air at safe, continuous operating temperatures during the most severe operations possible and in accordance with engine and transmission manufacturers' cooling system requirements. The cooling system shall be equipped with a removable coolant filter that also provides for the addition of supplementary coolant additives into the system. The cooling system fan/fans control should sense the temperatures of the operating fluids and the intake air and if either is above safe operating conditions the cooling fan should be engaged. The fan control system shall be designed with a fail-safe mode of "fan on". The cooling system in new condition shall have an ambient capacity of at least 110° F with water as coolant and sea level operation.</p>		
<p>2.68</p>	<p>The engine shall be cooled by a water-based, pressure type, cooling system that does not permit boiling or coolant loss during the operations described above. Engine thermostats shall be easily</p>		

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<p>Engine Cooling</p>	<p>accessible for replacement. Shutoff valves shall allow filter replacement without coolant loss. Valves shall permit complete shutoff of lines for the heating and defroster units, and water booster pumps. The water boost pump shall be a magnetically coupled, brushless design. All low points in the water-based cooling system shall be equipped with drain cocks. Air vent valves shall be fitted at high points in the cooling system unless it can be demonstrated that the system is self-purging.</p> <p>A correctly sized expansion tank shall be provided.</p> <p>A sight glass to determine satisfactory engine coolant level shall be provided and shall be accessible by opening one of the engine compartment's access doors. A spring-loaded, push button type valve to safely release pressure or vacuum in the cooling system shall be provided with both it and the water filler no more than 60 inches above the ground and both shall be accessible through the same access door.</p> <p>The radiator, and charge air cooler if integrated, shall be of durable corrosion-resistant construction with bolted-on removable tanks. The radiator shall be designed so a 2M mechanic can gain access to a substantial portion of the side facing the engine for the purpose of cleaning the radiator in five minutes or less.</p> <p style="padding-left: 40px;">Radiators with a fin density greater than 12 fins per inch, and louvered/slit designs, are more susceptible to clogging and deteriorating cooling performance over time and shall not be used.</p> <p style="padding-left: 40px;">Radiator piping shall meet the requirements of the section. No heat producing components or climate control system components shall be mounted between the engine cooling air intake aperture and the radiator.</p> <p style="padding-left: 40px;">The radiator and charge air cooler shall be designed to withstand thermal fatigue and vibration associated with the installed configuration.</p> <p style="padding-left: 40px;">The engine cooling system shall be equipped with a properly sized water filter with a spin-on element and an automatic system for releasing supplemental coolant additives as needed to replenish and maintain protection properties.</p> <p style="padding-left: 40px;">The cooling fan shall be temperature controlled, allowing the engine to reach operating temperature quickly. The temperature-controlled fan shall not be driven when the coolant temperature falls below the minimum level recommended by the engine manufacturer.</p>		
<p>2.69 Charge Air Cooling</p>	<p>The charge air cooling system, also referred to as after coolers or intercoolers shall provide maximum air intake temperature reduction with minimal pressure loss. The charge air radiator shall be sized and positioned to meet engine manufacturer's requirements. The charge air radiator shall not be stacked ahead or behind the engine radiator and shall be positioned as close to the engine as possible unless integrated with the radiator. Air ducting and fittings shall</p>		

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	be protected against heat sources, and shall be configured to minimize restrictions and maintain sealing integrity.		
2.70 Transmission Cooling	The transmission shall be cooled by a separate heat exchanger sized to maintain operating fluid within the transmission manufacturer's recommended parameters of flow, pressure and temperature. The transmission cooling system shall be matched to retarder and engine cooling systems to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer.		
2.71 Transmission	<p>The transmission shall be multiple speed, automatic shift with torque converter, retarder and electronic controls. Gross input power, gross input torque and rated input speed shall be compatible with the engine. A 3M mechanic, with optional assistance, shall be able to remove and replace the transmission assembly for service in less than 16 total combined man-hours. The transmission shall be designed to operate for not less than 300,000 miles on the design operating profile without replacement or major service.</p> <p>The electronic controls shall be compatible with multiplex wiring systems, capable of receiving inputs from the throttle, shift selector, engine, and transmission. Communication between the transmission and other electronically controlled vehicle systems shall be made using the SAE J1939 Recommended Practice communication link. Electronic controls shall be compatible with either 12 or 24 volt systems, provide consistent shift quality, and compensate for changing conditions such as variations in vehicle weight and engine power. A brake pedal application of 15 to 20 psi shall be required by the operator to engage forward or reverse range from the neutral position.</p> <p>The electronically controlled transmission shall have on-board diagnostic capabilities, able to monitor functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. A diagnostic reader device connector port, suitably protected against dirt and moisture, shall be provided in the operator's area. The on-board diagnostic system shall trigger a visual alarm to the operator when the electronic control unit detects a malfunction. The transmission shall contain built-in protection software to guard against severe damage.</p>		
2.72 Retarder	<p>The transmission shall be equipped with an integral hydraulic retarder designed to extend brake lining service life. The application of the retarder shall cause a smooth blending of both retarder and service brake functions without exceeding jerk requirements as defined herein. The transmission retarder on/off switch shall be located in the driver's compartment area. The bidder shall describe the location of the switch in his proposal, subject to final approval by Procuring Agency. Brake lights shall illuminate when the retarder is activated.</p> <p>The retarder shall be a three stage retarder with stages as follows: release the accelerator treadle – 1/3 applied 1 psi brake application – 2/3 applied 4 psi brake application – fully applied</p> <p>The thermostatically controlled cooling fan shall be activated when the retarder is engaged</p>		

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	and the coolant temperature exceeds the maximum limit established by the engine and transmission manufacturers.		
2.73 Jerk	The rate of change of acceleration measured at the centerline, floor level of the bus, shall be minimized throughout the shifting of each transmission range and retarder application and shall be no greater than 0.3 g/sec, for duration of a quarter-second or more.		
2.74 Optional Items Hybrid DRIVE SYSTEM	<p>The costing for an optional hybrid drive will be included in the bid proposal.</p> <p>Buses shall have a hybrid drive unit which, coordinated with the engine and rear axle drive ratio, enables the vehicle to achieve the required top speed, acceleration, and hill climbing capability while still maintaining passenger comfort and providing a smooth ride. The hybrid drive input torque rating shall exceed engine output torque. The hybrid drive shall be rated to operate at the GVWR of the bus. The hybrid drive shall be an "Allison EP40" or approved equal (the Procuring Agency will give consideration to alternate hybrid drive systems if a Request for Approved Equals with sufficient detail is submitted) with the following components: system controllers, dual power inverter module, and an energy storage and management system. The hybrid drive is to have the most current electronic control. It shall be designed to last the life of the bus.</p> <p>The engine and hybrid drive combination shall automatically prevent lugging when climbing hills of any gradient on which the bus is designed to operate. The hybrid drive and its push-button shift select control head shall be designed or interlocked so the possibility of damage or uncontrolled acceleration due to driver misuse of the shift select control head is minimized.</p> <p>The electronically controlled hybrid drive shall have on-board diagnostic capabilities, be able to monitor functions, store and time stamp out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. The hybrid drive shall contain built-in protection software to guard against severe damage. A diagnostic reader device connector port, suitably protected against dirt and moisture, shall be provided in the operator's area.</p> <p>Any devices cooled by engine coolant or oil shall have quarter-turn ball valves on each side of the device.</p> <p>For oil sampling, the hybrid drive shall be equipped with a "KP" or approved equal pushbutton oil sampling valve, with Viton seal, metal cap and 3/16" tubing spout barb.</p> <p>The hybrid drive shall be equipped with an overheat warning at the driver's station.</p>		
2.75 Mounting	The power plant shall be a rear drive in-line configuration (T-Drive). All power plant mounting shall be mechanically isolated to minimize transfer of vibration to the body structure as defined in section 5.4.1.5. Mounts shall control movement of the power plant so as not to affect performance of belt driven accessories or cause strain in piping and wiring connections to the power plant. The engine shall be mounted to provide maximum isolation of audible frequencies in the range of 35 to 275 Hertz. The engine cradle (if used) shall not interfere with the removal of the engine and propulsion system components and accessories.		

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<p>2.76 Service</p>	<p>The power plant shall be arranged so that accessibility for all routine maintenance is assured. No special tools, other than dollies and hoists, shall be required to remove the power plant. Two 3M mechanics shall be able to remove and replace the engine and transmission assembly in less than 20 total combined man-hours. The muffler, exhaust system, air cleaner, air compressor, starter, alternator, radiator, all accessories, and any other component requiring service or replacement shall be easily removable and independent of the engine and transmission removal. An engine oil pressure gauge and coolant temperature gauge shall be provided in the engine compartment. These gauges shall be easily read during service and mounted in an area where they shall not be damaged during minor or major repairs. There shall be 24 volt polarized plug-in connectors in the engine compartment for jump starting vehicles.</p> <p>Engine oil and the radiator filler caps shall be hinged to the filler neck and closed with spring pressure or positive locks. All fluid fill locations shall be properly labeled to help ensure correct fluid is added and all fillers shall be easily accessible with standard funnels, pour spouts, and automatic dispensing equipment. All lubricant sumps shall be fitted with drain plugs with problizer fittings of a standard size.</p> <p>The engine and transmission shall be equipped with sufficient heavy-duty fuel and oil filters for efficient operation and to protect the engine and transmission between scheduled filter changes. To the extent practicable, the filters shall be of the spin-on, disposable type or integral with the engine and transmission. All filters shall be easily accessible and the filter bases shall be plumbed to assure correct reinstallation. The engine shall be equipped with a fuel-priming pump or a check valve fitted in the fuel suction line to aid restarting after fuel filter changes.</p> <p>An air cleaner with a dry filter element and a graduated air filter restriction indicator shall be provided. The filter shall be removable by a 3M mechanic in 10 minutes or less. The location of the air intake system shall be designed to minimize the entry of dust and debris and maximize the life of the air filter. The engine air duct shall be designed to minimize the entry of water into the air intake system. Drainage provisions shall be included to allow any water/moisture to drain prior to entry into air filter.</p>		
<p>2.77 Accessories</p>	<p>Engine-driven accessories shall be unit mounted for quick removal and repair. Accessory drive systems shall operate without failure or unscheduled adjustment for not less than 50,000 miles on the design operating profile. These accessories shall be driven at speeds sufficient to assure adequate system performance during extended periods of idle operation and low route speed portion of the design operating profile. Belt guards shall be provided as required for safety and shall be sturdy in design and installation and readily removable. The belt guard(s) shall be hinged and feature "quick release" fasteners/hardware to gain access to accessories, belts, and drives. Accessories may be electrically driven.</p>		
<p>2.78 Hydraulic Systems</p>	<p>Any accessory may be driven hydraulically. The hydraulic system shall demonstrate a mean time between repairs in excess of 50,000 miles. Hydraulic system service tasks shall be minimized and scheduled no more frequently than those of other major coach systems. All elements of the hydraulic system shall be easily accessible for service or unit replacement. Critical points in the hydraulic system shall be fitted with service ports so that portable diagnostic equipment may be connected or sensors for an off-board diagnostic system permanently attached to monitor system operation. All hydraulic lines shall meet the requirements, and all</p>		

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	<p>elements of the hydraulic system shall meet the noise limits. A tamper-proof priority system shall prevent the loss of power steering during operation of the bus if other devices are also powered by the hydraulic system. All elements of the hydraulic system shall meet the accessibility loading requirements.</p> <p>Sensors in the hydraulic system, excluding those in the power steering system, shall indicate on the operator's on-board diagnostic panel conditions of low hydraulic fluid level.</p>		
<p>2.79 Fluid Lines, Fittings and Clamps, and Charge Air Pipe work</p>	<p>All fluid lines and air piping shall be rigidly supported to prevent chafing damage, fatigue failures, and tension strain. Lines passing through a panel, frame, or bulkhead shall be protected by grommets (or similar device) that fit snugly to both the line and the perimeter of the hole that the line passes through to prevent chafing and/or wear. All lines that pass through a bulkhead that constitutes a firewall shall utilize fireproof bulkhead fittings to prevent propagation of fire. The installation must not have kinks, twists or bends that place a strain on the respective line(s).</p> <p>Flexible fuel and oil lines shall be kept at a minimum and shall be as short as practicable. Flexible lines shall be routed or shielded so that failure of a line shall not allow fuel or oil to spray or drain onto any component operable above the auto-ignition temperature of the fluid. Flexible lines shall be Teflon hoses with braided stainless steel jackets except in applications where premium hoses are required and shall have standard SAE or JIC brass or steel, swivel, end fittings. Flexible hoses over 1 inch in diameter need not be Teflon with braided stainless steel jacket but shall be in conformance with SAE Standard J100R5. Flexible hoses and fluid lines shall not touch one another, or any part of the bus.</p> <p>Lines shall have a maximum length of six (6) feet unless demonstrated inappropriate for a given application. Hoses/lines shall be secured with heavy-duty stainless steel, full silicone rubber clamps.</p> <p>Compression fittings shall be standardized as much as practicable to prevent the intermixing of components. Compression fitting components from more than one manufacturer shall not be mixed even if the components are known to be interchangeable.</p>		
<p>2.80 Radiator</p>	<p>Radiator piping shall be stainless steel (high carbon stainless steel not acceptable) or brass tubing and, if practicable, rubber hoses shall be eliminated. Necessary hoses shall be premium, silicone rubber type that is impervious to all bus fluids. All hoses shall be as short as practicable. All hoses shall be secured with premium, stainless steel clamps that provide a complete 360° seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.</p>		
<p>2.81 Oil & Hydraulic Lines</p>	<p>Oil and hydraulic lines shall be compatible with the fluid they carry. The lines shall be designed and intended for use in the environment which they are installed, i.e., high temperatures in engine compartment, road salts, oils, etc. Lines shall be capable of withstanding maximum system pressures. Lines within the engine compartment shall be composed of steel tubing where practicable. Flexible lines shall be minimized in quantity and length.</p> <p>Hydraulic lines of the same size and with the same fittings as those on other piping systems of the bus, but not interchangeable, shall be tagged or marked for use on the hydraulic system</p>		

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	only. Hydraulic lines shall be individually and rigidly supported to prevent chafing damage, fatigue failures, and tension strain on the lines and fittings.		
2.82 Fuel Lines	<p>Fuel lines shall be rated and sized to prevent freezing and plugging due to condensation and/or fuel gelling in extreme winter.</p> <p>The fuel lines forward of the engine bulkhead shall be in conformance to SAE Standard J1149 Type 1 for copper tubing, corrosion-resistant stainless steel tubing or SAE Standard J844 for nylon tubing color coded orange.</p>		
2.83 Charge Air Piping	<p>Charge air piping and fittings shall be designed to minimize air restrictions and leaks. Piping shall be as short as possible and the number of bends minimized. The bend radii should be maximized to meet the pressure drop and temperature rise requirements of the engine manufacturers. The cross section of all charge air piping shall not be less than the cross section of the intake manifold inlet. Any changes in piping diameter shall be gradual to ensure a smooth passage of air and to minimize restrictions. Piping shall be routed away from exhaust manifolds and other heat sources, and shielded as required to meet the temperature rise requirements of the engine manufacturer.</p> <p>All offset hoses and main CAC duct work shall be wire or equal re-inforced. All clamping shall be the constant tension type. All ducting shall be properly supported with vinyl coated or equal, covered over metal clamps. All duct work shall permit thermal and other force loading without fatiguing and/or separation under normal operation.</p> <p>Charge air piping shall be constructed of either stainless steel, aluminized steel or anodized aluminum. Connections between all charge air piping sections shall be sealed with a short section of reinforced hose and stainless steel, constant tension clamps that provide a complete 360° seal.</p>		
2.84 Fuel Capacity	The fuel tank(s) shall have a total minimum capacity of 125 gallons. The useable amount of fuel shall be no less than 92% of the capacity of tank.		
2.85 Design and Construction	<p>The fuel tank(s) shall be equipped with an external, hex head, brass drain plug. It shall be at least a 3/8-inch size and shall be located at the lowest point of the tank(s). The fuel tank(s) shall have an inspection plate or easily removable filler neck to permit cleaning and inspection of the tank(s) without removal from the bus. The tank(s) shall be baffled internally to prevent fuel-sloshing noise regardless of fill level. The baffles or fuel pickup location shall assure continuous full power operation on a 6 percent upgrade for 15 minutes starting with no more than 25 gallons of fuel over the unusable amount in the tank(s). The bus shall operate at idle on a 6 percent downgrade for 30 minutes starting with no more than 10 gallons of fuel over the unusable amount in the tank(s).</p> <p>The fuel tank picks up and returns shall be properly arranged so that returned fuel is properly cooled. All interior fuel tank access openings shall be equipped with a reusable die cut gasket that shall maintain adequate sealing against vapor and/or liquid intrusion to the passenger areas of the vehicle. All interior tank access covers shall be equipped with reusable attachment hardware. All fuel tank appliances shall be designed in a manner that</p>		

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	<p>prevents fuel from accumulating at or near any horizontal surface of the tank.</p> <p>The fuel tank(s) shall be made of corrosion resistant stainless steel.</p>		
2.86 Installation	<p>The fuel tank(s) shall be securely mounted to the bus to prevent movement during bus maneuvers, but shall be capable of being removed and reinstalled by a 2M mechanic for cleaning or replacement in 1.5 hours or less.</p>		
2.87 Labeling	<p>The capacity, date of manufacture, manufacturer name, location of manufacture, and certification of compliance to Federal Motor Carrier Safety Regulation shall be permanently marked on the fuel tank(s). The markings shall be readily visible and shall not be covered with an undercoating material.</p>		
2.88 Fuel Filler	<p>The fuel filler shall be located 7 to 25 feet behind the centerline of the front door on the curbside of the bus. The filler cap shall be retained to prevent loss and shall be recessed into the body so that spilled fuel will not run onto the outside surface of the bus.</p> <p>The fuel lines forward of the engine bulkhead shall be in conformance to the SAE Standards identified in Section 5.2.2.3.4.</p> <p>The fuel filler shall accommodate a nozzle that forms a locked and sealed connection during the refueling process to eliminate spills. Fuel shall not be allowed to flow into the tank unless the nozzle has been properly coupled, locked and sealed to the filler. With the nozzle open, fuel shall enter the tank at a fill rate of not less than 40 gallons per minute of foam-free fuel without causing the nozzle to shut off before the tank is full. The nozzle shall automatically shut off when the tank is essentially full. Once disconnected, fuel shall not be allowed to flow through the nozzle at any time. Any pressure over 3 psi shall be relieved from the fuel tank automatically. An audible signal shall indicate when the tank is essentially full. The dry break system shall be compatible with the Procuring Agency's system defined in the attachment to Part 5, Technical Specifications.</p>		
2.89 Final Drive	<p>The bus shall be driven by a single heavy-duty MAN planetary axle or approved equal at the rear with a load rating sufficient for the bus loaded to GVWR. Transfer of gear noise to the bus interior shall be minimized. The rear axle shall be designed to operate for not less than 300,000 miles on the design operating profile without replacement or major repairs. The lubricant drain plug shall be magnetic type, external hex head of a standard size. The oil level in the planetary gears shall be easily checked through the plug or sight gauge. The drive shaft shall be guarded to prevent it striking the floor of the coach or the ground in the event of a tube or universal joint failure. Proper venting shall be provided and it shall be sufficiently well constructed so as not plug, kink or become otherwise degraded. The vent line shall be 3/8" ID minimum tubing and the run shall not exceed 5 feet with no more than 150° of curvature.</p> <p>The final drive shall by design, fabrication and proper application not emit noise/ vibration that is particularly noticeable when operating to its designed balancing velocity. The noise shall not be sufficiently narrow banded and/or of a quality where harmonic content shall generate or otherwise be the cause audible coupling (resonate) with other coach component(s) and/or systems.</p>		

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2.90 Exhaust Emissions	The engine shall meet all applicable emission standards.		
2.91 Exhaust Location	Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof. The exhaust pipe shall be of sufficient height to prevent exhaust gases and waste heat from discoloring or causing heat deformation to the bus roof. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component. The exhaust outlet shall be designed to minimize rain, snow or water generated from high-pressure washing systems from entering into the exhaust pipe and causing damage to the catalyst and/or diesel particulate filter. All exhaust system components shall be corrosion resistant stainless steel.		
2.92 Exhaust system	The Exhaust system after treatment device enclosure shall be suitably thermally insulated and protected by an intumescent coated structure designed to limit collateral damage from system malfunction. Albi-Clad TF, or approved equal shall be applied to the shielding structure. The structure shall incorporate an auxiliary thermal sensor that when satisfied shall initiate an orderly shutdown with attendant 3 rd party device logging and override regimes.		
2.93 Catalyzed Soot	The catalyzed soot filter mounting(s) shall be arranged to facilitate the quick change out of the maintenance portion of the filter. The filter shall be fitted in a manner that does not require the loosening of the upper mounting points and as such shall be arranged on downward facing steel pins that will provide the necessary location, and load support. The filter shall be band clamped and suitably anchored at the base. The clamps and associated gaskets shall be removable and renewable at one man hour, additionally, the unit shall process laterally (sideways) from the surround structure. The unit removal/installation shall not be encumbered by vehicle structure-no parts other than the door shall impede the R&R of the maintainable parts of these filters. The access door shall meet the general fire retardant. The Contractor shall supply a video demonstrating the removal and replacement of the unit.		
2.94 Shipping Containers	The Contractor shall supply 1 high density double wall plastic, stackable-interlocking shipping container per coach ordered. Containers are to be designed to safely transport the filter units during maintenance removal and transportation procedures. The shipping containers shall be equipped with suitable handles or grips designed to ensure safe handling and reduce the lifting stress imposed on maintenance personnel.		
2.95 Back Pressure and Temperature Recording	<p>The exhaust system shall be equipped with an integrated over-temperature and exhaust back pressure monitoring devices. Said devices shall be provided by the engine manufacturer and shall be fully integrated to their engine control and damage prevention systems. The monitoring system shall be configured as follows:</p> <ul style="list-style-type: none"> i.) The exhaust back pressure device shall monitor BP conditions and report information to its process control unit and/or 3rd party devices at an interval of 3 to 5 data sets per minute. ii.) The BP power reduction function shall be configured to be enabled/disabled through the vehicle multiplex system. The switching shall be password protected and disclosed by certified letter to the Maintenance Manager. The password shall not be contained in the Maintenance Manual or ancillary documents. iii.) Exhaust temperature shall be reported to 3rd party devices as defined by §5.4.6.1.6. Excessive exhaust temperature shall generate an orderly shutdown sequence with override methodology defined for other orderly shutdown regimes. A message at the operator's panel shall illuminate and maintain upon occurrence until reset by switch. Said event and reset 		

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	shall be logged to the 3 rd party device.		
2.96 Suspension	<p>GENERAL REQUIREMENTS</p> <p>Both the front and rear suspensions shall be pneumatic type. The basic suspension system shall last the service life of the bus without major overhaul or replacement. Normal replacement items, such as a suspension bushing, shock absorber, or air spring shall be replaceable by a 3M mechanic in 60 minutes or less. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Necessary adjustments shall be easily accomplished without removing or disconnecting the components. The suspension must not allow vehicle roll characteristics to exceed 12-14 degrees per g.</p>		
2.97 SPRINGS AND SHOCK ABSORBERS	<p>The suspension system shall permit a minimum wheel travel of 3 inches jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 3 inches rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body. Elastomeric bumpers shall be provided at the limit of jounce travel. Rebound travel may be limited by elastomeric bumpers or hydraulically within the shock absorbers. Radius rods and other stabilizing devices shall be provided as necessary at the axles to control lateral, longitudinal and torsional movement of the suspension system. Suspensions shall incorporate appropriate devices for automatic height control so that regardless of load the bus height relative to the centerline of the wheels does not change more than $\pm \frac{1}{2}$ inch at any point from the height required in Section 5.1.5.1.3. The valves shall have a damping or compensating feature to prevent excessive consumption of air during rapid axle fluctuations. If high flow height control valves are used the valve linkage shall be designed to minimize out of dead band operation during normal service axle jounce and rebound conditions.</p>		
2.98 Damping	<p>Vertical damping of the suspension system shall be accomplished by hydraulic shock absorbers mounted to the suspension arms or axles and attached to an appropriate location on the chassis. Two heavy duty hydraulic shock absorbers shall be provided on each side of the rear axle. Damping shall be sufficient to control coach motion to 3 cycles or less after hitting road perturbations. Shock absorbers shall maintain their effectiveness for at least 50,000 miles of the service life of the bus. Each unit shall be replaceable by a 2M mechanic in less than 15 minutes. The shock absorber bushing shall be made of elastomeric material that will last the life of the shock absorber.</p>		
2.99 Lubrication	<p>Lubrication</p> <p>All elements of steering, suspension, and drive systems requiring scheduled lubrication shall be provided with grease fittings conforming to SAE Standard J534. These fittings shall be located for ease of inspection, and shall be accessible with a standard grease gun without flexible hose end from a pit or with the bus on a hoist. Each element requiring lubrication shall have its own grease fitting with a relief path. Lubricant specified shall be standard for all elements on the bus</p>		

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	serviced by standard fittings. Grease fitting extensions may be used where necessary.		
3.00 Kneeling	<p>Kneeling A kneeling system shall lower the entrance(s) of the bus a minimum of 2.5 inches during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door(s), by the driver using a three position, spring loaded to center switch. Downward direction will lower the bus. Release of switch at anytime will completely stop lowering motion and hold height of the bus at that position. Upward direction of the switch will allow the system to go to floor height without the driver having to hold the switch up.</p> <p>Brake and Throttle interlock shall prevent movement when the bus is kneeled. The kneeling control shall be disabled when the bus is in motion. The bus shall kneel at a maximum rate of 1.25 inches per second at essentially a constant rate. After kneeling, the bus shall rise within 2 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum acceleration shall not exceed 0.2g and the jerk shall not exceed 0.3g/sec.</p> <p>An indicator visible to the driver shall be illuminated until the bus is raised to a height adequate for safe street travel. An audible warning alarm will sound simultaneously with the operation of the kneeler to alert passengers and bystanders. A warning light mounted near the curbside of the front door, minimum 2.5" diameter, amber lens shall be provided that will blink when kneel feature is activated. Kneeling shall not be operational while the wheelchair ramp is deployed or in operation.</p> <p>If full curbside kneeling is required to meet ADA Wheelchair Ramp Scope Requirements, the manufacturer shall</p> <p>provide an additional kneeling light and signage at the rear passenger</p>		
3.01 Wheels	<p>Wheels Wheels and rims shall be hub-piloted with 2-sided polished aluminum rims with Dura-Brite finish and shall include dura-flange rim protection. All wheels shall be interchangeable and shall be removable without a puller. Wheels shall be compatible with tires in size and load-carrying capacity. All wheels and tires shall be balanced as an assembly per SAE J1986.</p> <p>Two spare wheels and tires per coach must be provided.</p>		
3.02 Tires	<p>Tires Tires shall be suitable for the conditions of transit service and sustained operation at the maximum speed capability of the bus. Load on any tire at GVWR shall not exceed the tire supplier's rating. Tires shall be supplied by the contractor.</p> <p>The buses shall be equipped with low profile 305/70R-22.5 tires, Load range L as appropriate for the bus design.</p>		

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<p>3.03 Steering</p>	<p>FRONT AXLE</p> <p>The front axle shall be a solid beam type manufactured by MAN with an appropriate axle weight rating for the design capacity of the bus. The front axle shall be equipped with drum brakes. The front axle shall be equipped with grease type hubs wheel bearings and seals. The basic suspension system (nonwear components) shall last the life of the bus without major overhaul or replacement. All friction points on the front axle shall be equipped with replaceable bushings or inserts and lubrication fittings easily accessible from a pit or hoist.</p> <p>STRENGTH</p> <p>Fatigue life of all steering components shall exceed 1,000,000 miles. No element of the steering system shall sustain a Class I failure when one of the tires hits a curb or strikes a severe road hazard.</p> <p>TURNING RADIUS</p> <p>Outside body corner turning radius for a standard configuration 40-foot long bus shall not exceed 44 feet. A 35-foot long bus shall have a turning radius not to exceed 39 feet. A 30-foot long bus shall have a turning radius not to exceed 34 feet.</p> <p>TURNING EFFORT</p> <p>The steering wheel shall be no less than 20 inches in diameter and shall be shaped for firm grip with comfort for long periods of time, and shall be of synthetic resin or plastic construction with a metal core. The steering wheel shall be removable with a standard or universal puller. The steering column shall have full tilt and telescoping capability allowing the operator to easily adjust the location of the steering wheel.</p> <p>Hydraulically assisted power steering shall be provided. The steering gear shall be an integral type with flexible lines eliminated or the number and length minimized. Steering torque applied by the driver shall not exceed 10 foot-pounds with the front wheels straight ahead to turned 10 degrees. Steering torque may increase to 70 foot-pounds when the wheels are approaching the steering stops. Steering effort shall be measured with the bus at GVWR, stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement and the tires inflated to recommended pressure. Power steering failure shall not result in loss of steering control. With the bus in operation the steering effort shall not exceed 55 pounds at the steering wheel rim and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.</p> <p>Caster angle shall be selected to provide a tendency for the return of the front wheels to the straight position with minimal assistance from the driver.</p>		

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<p>3.04 Service Brake</p>	<p>SERVICE BRAKE</p> <p>Actuation Service brakes shall be controlled and actuated by a compressed air system. Force to activate the brake pedal control shall be an essentially linear function of the bus deceleration rate and shall not exceed 50 pounds at a point 7 inches above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver's heel when foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. A microprocessor controlled Automatic Braking System (ABS) and Automatic Traction Control (ATC) shall be provided. The microprocessor for the ABS/ATC system shall be protected yet in an accessible location to allow for ease of service. The total braking effort shall be distributed between all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations.</p> <p>Actuation of ABS and/or ATC shall override the operation of the brake retarder/recuperation system. The dynamic braking function shall automatically reset upon cessation of ABS/ATC active condition.</p> <p>Friction Material The entire service brake system, including friction material, shall have a minimum overhaul or replacement life of 30,000 miles with a brake retarder on the design operating profile. Brakes shall be self-adjusting throughout this period. Visible stroke indicators shall be provided to allow service personnel to easily identify when the brakes are not in correct adjustment. The brake linings shall be made of non-asbestos material. In order to aid maintenance personnel in determining extent of wear, a provision such as a scribe line or chamfer indicating the thickness at which replacement becomes necessary, shall be provided on each brake lining.</p> <p>The brake system material and design shall be selected to absorb and dissipate heat quickly so the heat generated during braking operation does not glaze brake linings. The heat generated shall not increase the temperature of tire beads and wheel contact area to more than that allowed by the tire manufacturer.</p> <p>Hubs and Drums Replaceable wheel bearing seals shall run on replaceable wear surfaces or be of an integral wear surface sealed design. Wheel bearing and hub seals shall not leak or weep lubricant for 100,000 miles when running on the design operating profile.</p> <p>The bus shall be equipped with drum brakes. Brake drums shall allow machining to ¼ inch oversize.</p> <p>PARKING /EMERGENCY BRAKE The parking brake shall be a spring-operated system, actuated by a valve that exhausts compressed air to apply the brakes. The parking brake may be manually enabled when the air pressure is at the operating level per FMVSS 121. An emergency brake release shall be provided to release the brakes in the event of automatic emergency brake application. The parking brake valve button will pop out when air pressure drops below requirements of FMVSS 121. The driver shall be able to manually depress and hold down the emergency brake release valve to release the brakes and maneuver the bus to safety. Once the operator releases the</p>		
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	<p>emergency brake release valve, the brakes shall engage to hold the bus in place.</p>												
<p>3.05 Pneumatic System</p>	<p>GENERAL</p> <p>The bus air system shall operate the air powered accessories and the braking system with reserve capacity. New buses shall not leak down more than 5 psi as indicted on the instrument panel mounted air gauges, within 60 minutes from the point of governor cut-off.</p> <p>Provision shall be made to apply shop air to the bus air systems using a standard tire inflation type valve. A quick disconnect fitting shall be easily accessible and located in the engine compartment and near the front bumper area for towing. Retained caps shall be installed to protect fitting against dirt and moisture when not in use. Air for the compressor shall be filtered through the main engine air cleaner system. The air system shall be protected by a pressure relief valve set at 150 psi and shall be equipped with check valve and pressure protection valves to assure partial operation in case of line failures. The vehicle air system shall contain a Ping Tank or Muffler Tank equipped with a drain. The pressure relief valve shall be located at the ping tank.</p>												
<p>3.06 AIR COMPRESSOR</p>	<p>The engine-driven air compressor shall be sized to charge the air system from 40 psi to the governor cutoff pressure in less than 3 minutes while not exceeding the fast idle speed setting of the engine.</p> <p>The air compressor capacity shall be the highest capacity available for the engine application in each model year/production run for the duration of the contract. All air reservoirs shall meet the requirements of SAE standard J10 and shall be equipped with drain plugs. The reservoir shall be sloped toward the drain plug.</p>												
<p>3.07 AIR LINES AND FITTINGS</p>	<p>Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844 for nylon tubing if not subject to temperatures over 200 degrees F. Nylon tubing shall be installed in accordance with the following color-coding standards:</p> <table border="0" style="margin-left: 40px;"> <tr> <td style="padding-right: 20px;">Green</td> <td>Indicates primary brakes and supply</td> </tr> <tr> <td>Red</td> <td>Indicates secondary brakes</td> </tr> <tr> <td>Brown</td> <td>Indicates parking brake</td> </tr> <tr> <td>Yellow</td> <td>Indicates compressor governor signal</td> </tr> <tr> <td>Black</td> <td>Indicates accessories</td> </tr> </table> <p>Line supports shall prevent movement, flexing, tension strain, and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Rigid lines shall be supported at no more than 5-foot</p>	Green	Indicates primary brakes and supply	Red	Indicates secondary brakes	Brown	Indicates parking brake	Yellow	Indicates compressor governor signal	Black	Indicates accessories		
Green	Indicates primary brakes and supply												
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	<p>intervals. Nylon lines may be grouped and shall be supported at 2-foot intervals or less.</p> <p>The compressor discharge line between power plant and body-mounted equipment shall be flexible convoluted copper or stainless steel line, or may be flexible Teflon hose with a braided stainless steel jacket. Other lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, swivel type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at 2-foot intervals or less.</p> <p>Air lines shall be clean before installation and shall be installed to minimize air leaks. All air lines shall be sloped toward a reservoir and routed to prevent water traps. Grommets or insulated clamps shall protect the air lines at all points where they pass through understructure components.</p>		
<p>3.08 AIR RESERVOIRS</p>	<p>All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10 and shall be equipped with guarded or flush type drain valves. Major structural members shall protect these valves and any automatic moisture ejector valves from road hazards if mounted at or below floor level. Reservoirs shall be sloped toward the drain valve. All air reservoirs shall have brass drain valves which discharge below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line.</p>		
<p>3.09 AIR SYSTEM DRYER</p>	<p>An air dryer shall prevent accumulation of moisture and oil in the air system. The air dryer system shall include a replaceable desiccant bed, electrically heated drain, and activation device. A 2M/3M mechanic shall replace the desiccant in less than 15 minutes.</p> <p>A compressor oil separator shall be installed into the air supply line between the compressor and air dryer. The oil separator shall be electrically activated by the brake circuit to discharge contaminants prior to the desiccant dryer. An automatically heated moisture ejector valve shall be installed in air the tank immediately forward of the wet tank. The moisture ejector valve shall function every time the brakes are applied on the vehicle.</p>		
<p>3.10 Body Design General</p>	<p>DESIGN</p> <p>The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria established by Part 5: Technical Specifications. The exterior and body features, including grilles and louvers, shall be shaped to facilitate cleaning by automatic bus washers without snagging washer brushes. Water and dirt shall not be retained in or on any body feature to freeze or bleed out onto the bus after leaving the washer. The body and windows shall be sealed to prevent leaking of air, dust, or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus. Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. When panels are lapped, the upper and forward panels shall act as a watershed. However if entry of moisture into interior of vehicle is prevented by other means, then rear cap panels may be lapped otherwise. The windows, hatches, and doors shall be able to be sealed. Accumulation on any window of the bus of spray and splash generated by the bus' wheels on a wet road shall be minimized.</p>		

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<p>3.11 Crash Worthiness</p>	<p>The bus body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a 6-inch reduction in any interior dimension. Windows shall remain in place and shall not open under such a load. These requirements must be met without components such as roof mounted air conditioning installed.</p> <p>The bus shall withstand a 25-mph impact by a 4,000-pound automobile at any point, excluding doorways, along either side of the bus with no more than 3 inches of permanent structural deformation at seated passenger hip height. This impact shall not result in sharp edges or protrusions in the bus interior.</p> <p>Exterior panels below 35 inches from ground level shall withstand a static load of 2,000 pounds applied perpendicular to the bus by a pad no larger than 5 inches square. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.</p>		
<p>3.12 MATERIALS</p>	<p>Unless otherwise specifically provided, all equipment and articles incorporated in the work are to be new and of the most grade for the purpose intended. Body materials shall be selected and the body fabricated to reduce maintenance, extend durability, and provide consistency of appearance throughout the service life of the bus. Detailing shall be kept simple; add-on devices and trim, where necessary, shall be minimized and integrated into the basic design.</p>		
<p>3.13 CORROSION</p>	<p>The bus flooring, sides, roof, understructure, and axle suspension components shall resist corrosion or deterioration from atmospheric conditions and road salts for a period of 12 years or 500,000 miles which ever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, provided that it is maintained by the Procuring Agency in accordance with the procedures specified in the Contractor's service manual. With the exception of periodically inspecting the visible coatings applied to prevent corrosion and reapplying these coatings in limited spots, the Contractor shall not require the complete reapplication of corrosion compounds over the life of the bus.</p> <p>All exposed surfaces and the interior surfaces of tubing and other enclosed members below lower window line shall be corrosion resistant.</p> <p>All materials that are not inherently corrosion resistant shall be protected with corrosion-resistant coatings. All joints and connections of dissimilar metals shall be corrosion-resistant and shall be protected from galvanic corrosion. Representative samples of all materials and connections shall withstand a 2-week (336-hour) salt spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces, and no weight loss of over 1 percent.</p>		

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<p>3.14 RESONANCE AND VIBRATION</p>	<p>All structure, body, and panel-bending mode frequencies, including vertical, lateral, and torsional modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible, or sensible resonant vibrations during normal service.</p>		
<p>3.15 Fire Wall</p>	<p>The passenger and engine compartments shall be separated by a bulkhead(s) that shall, by incorporation of fireproof materials in its construction, be a firewall. There shall be no openings in the material that will allow the introduction of flames from one side of the firewall to the other. The engine compartment shall include areas where the engine and exhaust system are housed including the muffler, if mounted above the horizontal shelf. This firewall shall preclude or retard propagation of an engine compartment fire into the passenger compartment and shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993. Only necessary openings shall be allowed in the firewall, and these shall be fireproofed. Any passageways for the climate control system air shall be separated from the engine compartment by fireproof material. Piping through the bulkhead shall have copper, brass, or fireproof fittings sealed at the firewall with copper or steel piping on the forward side. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the firewall. Engine access panels in the firewall shall be fabricated of fireproof material and secured with fireproof fasteners. These panels, their fasteners, and the firewall shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the firewall.</p>		
<p>3.16 Distortion</p>	<p>The bus, loaded to GVWR and under static conditions, shall not exhibit deflection or deformation that impairs the operation of the steering mechanism, doors, windows, passenger escape mechanisms and service doors. Static conditions shall include the vehicle at rest with any one wheel or dual set of wheels on a 6-inch curb or in a 6-inch deep hole. Each bus chassis shall have a body alignment check performed on it to ensure that its axle housing and axle frame (when so designed) are properly centered and aligned to the chassis frame center and each other, also to prevent the vehicle from "dog tracking". This check shall include either a diagonal measurement across the bus undercarriage or four (4) control points on the axles or axle hubs; a double triangulation of the front and rear axle hubs, and a linear measurement of the wheel base on both sides of the vehicle, or another mutually agreeable and verifiable squaring method.</p>		
<p>3.17 Design Structure</p>	<p>GENERAL:</p> <p>The structure of the bus shall be designed to withstand the transit service conditions typical of an urban duty cycle. The Design Operating Profile shall be considered for this purpose.</p>		
<p>3.18 Altoona Testing</p>	<p>Prior to acceptance of first bus, the structure of the bus shall have undergone appropriate structural testing and/or analysis, including FTA required Altoona testing, to ensure adequacy of design for the urban transit service. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing</p>		

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	<p>and explaining the failures and corrective actions taken to ensure any and all such failures will not occur shall be submitted to the Procuring Agency. (See Attachment "E")</p>		
<p>3.19 Towing</p>	<p>Towing devices shall be provided on each end of the bus. Towing devices should accommodate flat-bedding or flat-towing. Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 degrees of the longitudinal axis of the bus. The rear towing device(s) shall not provide a toe-hold for unauthorized riders.</p> <p>The front towing devices shall allow attachment of adapters for a rigid tow bar and shall permit lifting of bus until the front wheels are clear off the ground in order to position the bus on the towing equipment by the front wheels.</p>		
<p>3.20 Jacking</p>	<p>It shall be possible to safely jack up the bus, at curb weight, with a common 10-ton floor jack 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 bus. 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 single tire. Jacking and changing any one tire shall be 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.</p> <p>Jacking pads shall be painted safety yellow or orange for ease of identification.</p>		
<p>3.21 Hoisting</p>	<p>The bus axles or jacking plates shall accommodate the lifting pads of a 2-post hoist system. Jacking plates, if used as hoisting pads, shall be designed to prevent the bus from falling off the hoist. Other pads or the bus structure shall support the bus on jack stands independent of the hoist.</p>		
<p>3.22 Floor Design</p>	<p>The floor shall be essentially a continuous flat plane, except at the wheel housings and platforms. The floor height shall be as specified to eliminate steps and facilitate boarding and de-boarding of passengers.</p> <p>The floor design shall consist of two levels (bi-level construction). Aft of the rear door extending to the rear settee riser, the floor height may be raised to a height approximately 18 inches above the lower level. In the transition area, a step tread with a minimum depth of 18 inches shall be provided. Step risers between the two levels shall be a maximum of 10 inches in height. An increase slope shall be allowed on the upper level not to exceed 3.5 degrees off the horizontal.</p>		

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	<p>Where the floor meets the walls of the bus, as well as other vertical surfaces, such as, platform risers, the surface edges shall be blended with a circular section of radius not less than 1 inch. Similarly, a molding or cove shall prevent debris accumulation between the floor and wheel housings. The vehicle floor in the area of the entrance and exit doors shall have a lateral slope not exceeding 2 degrees to allow for drainage.</p>		
<p>3.23 Floor Strength</p>	<p>The floor deck may be integral with the basic structure or mounted on the structure securely to prevent chafing or horizontal movement and designed to last the life of the bus. Sheet metal screws shall not be used to retain the floor and all floor fasteners shall be serviceable from one side only. The use of adhesives to secure the floor to the structure shall be allowed only in combination with the use of bolt or screw fasteners and its effectiveness shall last throughout life of the coach. Tapping plates, if used for the floor fasteners, shall be no less than the same thickness as a standard nut and all floor fasteners shall be secured and protected from corrosion for the service life of the bus. The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an elastic deflection of no more than 0.60 inches from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. Floor, with coverings applied, shall withstand a static load of at least 150 pounds applied through the flat end of a ½ inch-diameter rod, with 1/32-inch radius, without permanent visible deformation.</p>		
<p>3.24 Floor Construction</p>	<p>The floor shall consist of the subfloor and the floor covering. The floor, as assembled, including the sealer, attachments and covering shall be waterproof, nonhygroscopic, and resistant to mold growth. The subfloor shall be resistant to the effects of moisture, including decay (dry rot). It shall be impervious to wood destroying insects such as termites.</p> <p>If plywood is used, it shall be certified at the time of manufacturing by an industry approved third-party inspection agency such as APA – The Engineered Wood Association (formerly the American Plywood Association). Plywood shall be of a thickness adequate to support the design loads, manufactured with exterior glue, satisfy the requirements of a Group I Western panel as defined in PS 1-95 (Voluntary Product Standard PS 1-95, Construction and Industrial Plywood) and be of a grade that is manufactured with a solid face and back. Plywood shall be installed with the highest-grade veneer up. Plywood shall be pressure-treated with a preservative chemical that prevents decay and damage by insects. Preservative treatments shall utilize no EPA listed hazardous chemicals. The concentration of preservative chemical shall be equal to or greater than required for an above ground level application. Treated plywood will be certified for preservative penetration and retention by a third party inspection agency. Pressure-preservative treated plywood shall have a moisture content at or below fifteen percent. A barrier shall be installed to prevent contact by road salt with the plywood panels.</p> <p>Fasteners shall be compatible with the sub-flooring. Fasteners shall not corrode or react with the chemicals used to pressure treat the sub-flooring.</p>		

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<p>3.25 Platforms General</p>	<p>PLATFORMS</p> <p>General Platform height shall not exceed 12 inches. Trim shall be provided along top edges of platforms unless integral nosing is provided. Except where otherwise indicated, covering of platform surfaces and risers shall be same material as specified for floor covering.</p> <p>Other raised areas such as for providing space for underfloor installation of components shall be limited. Such raised areas shall be constructed in accordance to these specifications.</p>		
<p>3.26 Operator's Platform</p>	<p>Operator's Platform The operator's platform shall be of a height to render the position of the operator with respect to the road surface the same as on standard floor buses. If the height of the operator's platform exceeds 12 inches, a step shall be provided to allow for ease in boarding. A warning decal or sign shall be provided to alert operator to the change in floor level.</p>		
<p>3.27 Farebox</p>	<p>Farebox If the driver's platform is higher than 12 inches, then the farebox is to be mounted on platform of suitable height to provide accessibility for operator without compromising passenger's access.</p>		
<p>3.28 Intermediate Platform</p>	<p>Intermediate Platform</p> <p>If vehicle is of a bi-level floor design, an intermediate platform shall be provided along the center aisle of the bus to facilitate passenger traffic between the upper and lower floor levels. This intermediate platform shall be cut into the rear platform and shall be approximately the aisle width, 18 inches deep and approximately one half the height of the upper level relative to the lower level. The horizontal surface of this platform shall be covered with yellow Hypalon ribbed rubber or skid-resistant material and shall be sloped slightly for drainage. A warning decal or sign shall be provided at the immediate platform area to alert passengers to the change in floor level.</p>		
<p>3.29 Wheel Housing Design</p>	<p>WHEEL HOUSING</p> <p>Design Sufficient clearance and air circulation shall be provided around the tires, wheels, and brakes</p>		

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	<p>to preclude overheating when the bus is operating on the design operating profile.</p> <p>Interference between the tires and any portion of the bus shall not be possible in maneuvers up to the limit of tire adhesion with weights from curb weight to GVWR. Wheel housings shall be adequately reinforced where seat pedestals are installed. Wheel housings shall have sufficient sound insulation to minimize tire and road noise.</p> <p>Design and construction of front wheel housings shall allow for the installation of radio/electronic equipment storage compartment on interior top surface or its use as a luggage rack. Wheel chock holder and emergency equipment box shall be installed on top of curbside wheel housing.</p> <p>The exterior finish of the front wheel housings shall be scratch-resistant, Interior Panels and Finishes, and complement interior finishes of the bus to minimize the visual impact of the wheel housing. If fiberglass wheel housings are provided, then they shall be color-impregnated to match interior finishes. The lower portion extending to approximately 12 inches above floor shall be equipped with additional mar-resistant coating or stainless steel trim.</p>		
<p>3.30 Wheel Housing Design</p>	<p>Construction Wheel housings shall be constructed of corrosion-resistant, fire-resistant material. Wheel housings, as installed and trimmed, shall withstand impacts of a 2-inch steel ball with at least 200 foot-pounds of energy without penetration.</p>		
<p>3.31 PEDESTRIAN SAFETY</p>	<p>PEDESTRIAN SAFETY Exterior protrusions greater than ½ inch and within 80 inches of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors and required lights and reflectors are exempt from the protrusion requirement. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize the ability of unauthorized riders to secure toeholds or handholds.</p>		
<p>3.32 Rain Gutters</p>	<p>RAIN GUTTERS Rain gutters shall be provided to prevent water flowing from the roof onto the side windows, passenger doors, operator's side window, and exterior mirrors. When the bus is decelerated, the gutters shall not drain onto the windshield, or operator's side window, or into the door boarding area. Cross sections of the gutters shall be adequate for proper operation. All gutters shall be continuous along the side of the bus. This includes all components used to form the gutter system.</p>		
<p>3.33 License Plate Provisions</p>	<p>LICENSE PLATE PROVISIONS Provisions shall be made to mount standard size U.S. license plates per SAE J686 on the front</p>		

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	<p>and rear of the bus. These provisions shall direct mount or recess the license plates so that they can be cleaned by automatic bus washing equipment without being caught by the brushes. License plates shall be mounted at the lower center or lower street side of the bus and shall not allow a toehold or handhold for unauthorized riders.</p>		
<p>3.34 Fender Skirts</p>	<p>FENDER SKIRTS</p> <p>Features to minimize water spray from the bus in wet conditions shall be included in wheel housing design. Any fender skirts shall be easily replaceable. They shall be flexible if they extend beyond the allowable body width. Wheels and tires shall be removable with the fender skirts in place.</p>		
<p>3.35 Splash Aprons</p>	<p>SPLASH APRONS</p> <p>Splash aprons, composed of 1/4-inch-minimum composition or rubberized fabric, shall be installed behind and/or in front of wheels as needed to reduce road splash and protect underfloor components. The splash aprons shall extend downward to within 4 inches of the road surface at static conditions. Apron widths shall be no less than tire widths, except for the front apron that shall extend across the width of the bus. Splash aprons shall be bolted to the bus understructure. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. The flexible portions of the splash aprons shall not be included in the road clearance measurements. Other splash aprons shall be installed where necessary to protect bus equipment.</p>		
<p>3.36 Service Compartments & Access Doors</p>	<p>SERVICE COMPARTMENTS AND ACCESS DOORS – EXTERIOR</p> <p>Access Doors</p> <p>Conventional or pantograph hinged doors shall be used for the engine compartment and for all auxiliary equipment compartments including doors for checking the quantity and adding to the engine coolant. The main engine door shall be used to check and fill engine lubricant and propulsion system fluid. Access openings shall be sized for easy performance of tasks within the compartment including tool operating space. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. Doors with top hinges shall have safety props stored behind the door or on the doorframe. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems. If applicable, an exterior, driver’s heater/defroster access door may be hinged from the bottom. The access door shall be retained in the open position with cables or by other means to preclude contact/damage from the bumper or bicycle rack.</p>		

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	<p>Access doors larger in area than 100 square inches shall be equipped with corrosion resistant flush-mounted locks. All such access door locks that require a tool to open shall be standardized throughout the vehicle and will require a nominal 5/16-inch square male tool to open or lock.</p> <p>The battery compartment or enclosure shall be vented and self-draining. It shall be made from 304 stainless steel, accessible only from outside the bus. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte and gases emitted by the battery. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. The batteries shall be secured by a restraint means. A locking slide-out tray constructed of 304 stainless steel shall be provided for the servicing of the batteries. The tray shall permit the batteries to fully clear the bus side panel, allowing maintenance personnel full access to the tops of the batteries. All power cabling which passes through the compartment walls shall have "feed through studs" or properly bushed holes.</p> <p>The Master Battery Switch shall be accessible from the outside of the bus. Access shall be gained through a spring loaded, non-latching door. The access door shall be clearly identified from the outside of the bus as the Battery Shut-Off.</p>		
<p>3.37 Service Area Lighting</p>	<p>Service Area Lighting</p> <p>Lights shall be provided in the engine and all other compartments, where service may be required, to generally illuminate the area for night emergency repairs or adjustments. The lights in the engine compartment shall be controlled by a switch located near the rear start controls in the engine compartment. Necessary lights, located in other service compartments, shall be provided with switches on the light fixture or convenient to the light. All light switches shall have on/off decals. Lighting shall be waterproof and sealed to prevent the entrance of dirt, debris and moisture from pressure washing.</p>		
<p>3.38 Bumpers</p>	<p>BUMPERS</p> <p>Location Bumpers shall be of the energy absorption-type and shall provide impact protection for the front and rear of the bus with the top of the bumper being 28 ± 2 inches above the ground. The bumpers shall wrap around the bus to the extent practicable without exceeding allowable bus width. Bumper height shall be such that when one bus is parked behind another, a portion of the bumper faces will contact each other.</p> <p>Front Bumper No part of the bus, including the bumper, shall be damaged as a result of a 5-mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus' longitudinal centerline. The bumper shall return to its pre-impact shape within 10 minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the Common Carriage with Contoured Impact Surface defined in Figure 2 of FMVSS 301 loaded to 4,000</p>		

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	<p>pounds parallel to the longitudinal centerline of the bus and 5.5-mph impacts into the corners at a 30 degree angle to the longitudinal centerline of the bus. The energy absorption system of the bumper shall be independent of every power system of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than 7 inches.</p> <p>Rear Bumper The rear bumper and its mounting shall provide impact protection to the bus at curb weight from a 2-mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper 2 feet wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to 5 mph, over pavement discontinuities up to 1 inch high, and at accelerations up to 2 mph/sec. The rear bumper shall protect the bus, when impacted anywhere along its width by the Common Carriage with Contoured Impact Surface defined in Figure 2 of FMVSS 301 loaded to 4,000 pounds, at 4 mph parallel to, or up to a 30 degree angle to, the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude unauthorized riders standing on the bumper. The bumper shall be independent of all power systems of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length by no more than 7 inches.</p> <p>Bumper Material Bumper material shall be corrosion-resistant, and color impregnated, and withstands repeated impacts of the specified loads without sustaining damage. Visible surfaces shall be black or color-coordinated with the bus exterior. The bumper qualities shall be sustained throughout the service life of the bus.</p>		
<p>3.39 Finish and Color</p>	<p>FINISH AND COLOR</p> <p>All exterior surfaces shall be smooth and free of visible fasteners, wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system supplier, prior to application of paint to assure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting to prevent corrosion. The bus shall be completely painted prior to installation of exterior lights, windows, mirrors and other items which are applied to the exterior of the bus. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.</p> <p>Paint shall be applied smoothly and evenly with the finished surface free of dirt and the following other imperfections:</p> <ul style="list-style-type: none"> A. Blisters or bubbles appearing in the topcoat film. B. Chips, scratches, or gouges of the surface finish. C. Cracks in the paint film. D. Craters where paint failed to cover due to surface contamination. E. Overspray. F. Peeling. 		

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	<p>G. Runs or sags from excessive flow and failure to adhere uniformly to the surface.</p> <p>H. Chemical stains and water spots.</p> <p>I. Orange Peel</p> <p>To the degree consistent with industry standards for commercial vehicle finishes, painted surfaces shall have gloss finish. All exterior finished surfaces shall be impervious to diesel fuel, gasoline and commercial cleaning agents. Finished surfaces shall resist damage by controlled applications of commonly used graffiti-removing chemicals. Colors and paint schemes shall be specified by the Procuring Agency.</p> <p>Except for periodic cleaning, exterior surfaces of the bus shall be maintenance-free, permanently colored and not require refinish/repaint for the life of the vehicle. In general, the exterior surfaces shall be white except as specified in the Technical Specifications. Durable, peel-resistant pressure sensitive appliques shall be used for any striping and coloring required.</p>		
<p>3.40 Numbering and Signing</p>	<p>NUMBERING AND SIGNING</p> <p>Monograms, numbers and other special signing specified by the Procuring Agency shall be applied to the inside and outside of the bus as required. Signs shall be durable and fade-, chip-, and peel-resistant; they may be painted signs, decals, or pressure-sensitive appliques. All decals shall be sealed with clear, waterproof sealant around all exposed edges if required by the decal supplier. Signs shall be provided in compliance with the ADA requirements defined in 49 CFR Part, Subpart B, 38.27. The exact wording, size, color, and locations for these signs are found with requirements for other special signs in the Technical Specifications.</p> <p>Buses shall be numbered consecutively. Numbers to be assigned to vehicles after award of contract. Number placements are found in attachments to Part 5: Technical Specifications.</p>		
<p>3.41 Exterior Lighting</p>	<p>EXTERIOR LIGHTING</p> <p>All exterior lights shall be designed to prevent entry and accumulation of moisture or dust, and each lamp shall be replaceable in less than 5 minutes by a 2M mechanic helper. Commercially available LED (Light Emitting Diode)-type lamps shall be used wherever possible. Lights mounted on the engine compartment doors shall be protected from the impact shock of door opening and closing, engine heat and detergents used by automatic bus washing equipment. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. Two hazard lamps at the rear of the bus shall be visible from behind when the engine service doors are opened. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer. Lights located on the roof and sides (directional's) of the bus shall have protective shields or be of the flush mount type to protect the lens against minor impacts.</p> <p>A high-mount rear LED brake light(s) shall be provided in addition to the standard left and right side brake lights.</p> <p>Visible and audible warning shall inform following vehicles or pedestrians of reverse operation.</p>		

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	<p>Visible reverse operation warning shall conform to SAE Standard J593 as revised. Audible reverse operation warning shall conform to SAE Recommended Practice J994 Type C or D as revised.</p> <p>Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than two foot-candles for a distance of 3 feet outward from the door step edge. The lights may be positioned above or below the lower daylight opening of the windows and shall be shielded to protect passengers' eyes from glare.</p> <p>Turn-signal lights shall be provided on both sides of the bus. Specific number and mounting requirements are defined in attachments to Part 5: Technical Specifications.</p> <p>A license plate bracket and light shall be provided at the rear of the bus.</p> <p>Flashing directional signals with controls mounted on the floor in the operator's compartment shall be provided. Turn signal lights shall be provided on both sides of the vehicles as well as on the front and rear of the bus with foot control switches and an "override" or emergency flasher switch to permit continuous "4-Way" of all directional lights for emergency parking. The turn signals shall not be canceled by service brake application. The back-up and stop lights shall be installed on the rear of the bus. If turn signal system is not an incorporated feature of an integrated vehicle electronic system, then the flasher system shall be totally electronic.</p> <p>The clearance and identification "LED" lights and reflectors shall be installed in accordance with FMVSS108 and this Technical Specification.</p> <p>Identification Lights: Cluster of three (3) 4-candle power, "LED" clearance lights shall be mounted near the top of the roof and on the body center line, one on the front of the bus with amber lenses and one on the rear of the bus with red lenses.</p> <p>Clearance Lights: Four (4) 4-candle power "LED" 12 VDC marker lights shall be installed, on each upper corner and side of the body. The four (4) front fixtures shall have amber-colored lenses and the four (4) rear fixtures shall have red-colored lenses.</p> <p>Two 4-candle power 12 VDC intermediate marker lights, one on each side of the bus, shall be installed at approximately the center of the bus. The lights shall be amber-colored.</p>		
<p>3.42 Interior Panels and Finishes</p>	<p>GENERAL</p> <p>The interior shall be simple, modern and free from superficial design motifs. It shall have no sharp depressions or inaccessible areas and shall be easy to clean and maintain. Materials shall be selected on the basis of maintenance, durability, appearance, safety, flammability, and tactile qualities. Trim and attachment details shall be kept simple and unobtrusive. Handholds, lights, air vents, armrests and other interior fittings shall appear to be integral with the bus interior. Materials shall be strong enough to resist everyday abuse and vandalism; they shall be resistant to scratches and markings. Interior trim shall be secured to avoid resonant vibrations</p>		

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	<p>under normal operational conditions. The joints (gap) between wall trim panels, wall panels, ceiling and flooring shall not be greater/wider than 1/32 inch.</p> <p>Interior surfaces more than 10 inches below the lower edge of the side windows or windshield shall be shaped so that objects placed on them fall to the floor when the coach is parked on a level surface. Interior shall be easily cleanable with commercial cleaning agents. The entire interior shall be cleanable with a hose, using a liquid soap attachment. Water and soap should not normally be sprayed directly on the instrument and switch panels.</p>		
<p>3.43 Front End</p>	<p>FRONT END</p> <p>The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the operator from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing or walking in the front of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the operator's compartment shall be formed metal or plastic material and sealed to prevent liquid from entering through the top of panels into electrical compartments. Formed metal dash panels shall be painted and finished to the quality described in Section 5.4.3.9 or may be vinyl covered. Plastic dash panels shall be reinforced, as necessary, vandal-resistant, and replaceable. All colored, painted, and plated parts forward of the operator's barrier shall be finished with a dull matte surface to reduce glare. Colors shall match or coordinate with the balance of the bus interior.</p>		
<p>3.44 Rear End Interior</p>	<p>REAR END</p> <p>The rear bulkhead and rear interior surfaces shall be material suitable for exterior skin, painted and finished to exterior quality, or paneled with melamine-type material, plastic, or carpeting and trimmed with stainless steel, aluminum, or plastic. The color and finish shall be subject to approval by the Procuring Agency.</p>		
<p>3.45 Interior Panels</p>	<p>INTERIOR PANELS</p> <p>General</p> <p>Interior side trim panels and operator's barrier shall be textured stainless steel, anodized aluminum, plastic, melamine-type material, or carpeting. Finish shall permit easy removal of paint, greasy fingerprints, ink and permanent marker. Panels shall be easily replaceable and tamper-resistant. They shall be reinforced, as necessary, to resist vandalism and other rigors of transit bus service. Individual trim panels and parts shall be interchangeable to the extent practicable. Untrimmed areas shall be painted and finished to the quality described. All materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993. The colors, patterns, and materials for the interior trim shall be subject to approval by the Procuring Agency.</p>		

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<p>3.46 Operator Barrier</p>	<p>Operator Barrier</p> <p>A barrier or bulkhead between the operator and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. The barrier shall extend from below the level of the passenger or operator's seat cushion, whichever is lower, to above the level of the seated operator's head and shall fit the bus side windows and wall to prevent passengers from reaching the operator or the operator's personal effects.</p>		
<p>3.47 Modesty Panels</p>	<p>Modesty Panels</p> <p>Sturdy divider panels constructed of durable, unpainted, corrosion-resistant material complementing the interior trim shall be provided to act as both a physical and visual barrier for seated passengers. The panels shall not drum and/or resonate with any operating mode. Modesty panels shall be located at doorways to protect passengers on adjacent seats, and along front edge of rear upper level. Design and installation of modesty panels located in front of forward facing seats shall include a handhold/grabhandle along its top edge. These dividers shall be mounted on the sidewall and shall project toward the aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend no higher than the lower daylight opening of the side windows and those forward of transverse seats shall extend downward to a level between 1½ and 1 inches above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways shall provide no less than a 2½-inch clearance between the modesty panel and the opened door to protect passengers from being pinched. The rear dividers shall be extended by glazed sections (windscreens) to above the rear passenger door opening. Modesty panels installed at doorways shall be equipped with grab rails. The modesty panel and its mounting shall withstand a static force of 250 pounds applied to a four-inch by four-inch area in the center of the panel without permanent visible deformation.</p> <p>The Procuring Agency shall delete the requirement for a separate modesty panel at the rear of the front door if it can be demonstrated that the purpose of the panel can be satisfied through alternate methods such as the arrangements of the front wheel housing.</p>		
<p>3.48 Rear Bulkhead</p>	<p>Rear Bulkhead</p> <p>The rear bulkhead paneling shall be contoured to fit the ceiling, side walls, and seat backs so that any litter, such as a cigarette package or newspaper, will tend to fall to the floor or seating surface when the bus is on a level surface. Any air vents in this area shall be louvered to reduce airflow noise and to reduce the probability of trash or litter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, the panel shall be hinged or shall be able to be removed and replaced by a 3M mechanic in 5 minutes. Grilles where access to or adjustment of equipment is required shall be heavy duty and designed to minimize damage. Panel shall be retained in place utilizing standard 5/16" square drive flush-recessed mounted latches.</p>		

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<p>3.49 Headlining</p>	<p>Headlining Ceiling panels shall be textured stainless steel, anodized aluminum, melamine-type material, or material suitable for exterior skin, painted and finished to exterior quality. Headlining shall be supported to prevent buckling, drumming, or flexing and shall be secured without loose edges. Headlining materials shall be treated or insulated to prevent marks due to condensation where panels are in contact with metal members. Moldings and trim strips, as required to make the edges tamperproof, shall be stainless steel, aluminum, or plastic, colored to complement the ceiling material. Headlining panels covering operational equipment that is mounted above the ceiling shall be on hinges for ease of service but retained to prevent inadvertent opening. Colors, patterns, and materials for the headlining shall be subject to approval by the Procuring Agency.</p>		
<p>3.50 Fastening</p>	<p>Fastening Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Panels and trim shall be shaped, sized and attached to eliminate alignment and fit gaps. Panels and fasteners shall not be easily removable by passengers. Interior trim fasteners, where required, shall be Torx™-head fasteners.</p>		
<p>3.51 Insulation Material</p>	<p>Insulation Any insulation material used between the inner and outer panels shall be fire-resistant, sealed or self-sealing to minimize entry and/or retention of moisture. Insulation properties shall be unimpaired by vibration compacting, or settling during the life of the bus. The insulation material shall be non-hygroscopic and resistant to fungus and breeding of insects. The use of formaldehyde foam insulation is precluded. Any insulation material used inside the engine compartment shall not absorb or retain oils or water and shall be designed to prevent casual damage that may occur during maintenance operations. All insulation materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90, dated October 20, 1993.</p> <p>The combination of inner and outer panels on the sides, roof, wheelwells and ends of the bus, and any material used between these panels shall provide a thermal insulation sufficient to meet the interior temperature requirements in the Technical Specifications. The bus body shall be thoroughly sealed so that the operator or passengers cannot feel drafts during normal operations with the passenger doors closed.</p>		
<p>3.52 Floor Covering</p>	<p>FLOOR COVERING The floor covering shall have a non-skid walking surface with heat-welded seams that remains effective in all weather conditions and complies with all ADA requirements, such as Altro or approved equal. The floor covering, as well as transitions of flooring material to the main floor and to the entrance and exit area, shall be smooth and present no tripping hazards. All flooring seams shall be welded using the flooring manufacturers recommended practices and materials. The floor covering shall extend to the top of the side wall cove. The floor covering shall be laid as to minimize transverse seams. A stainless or aluminum strip with a minimum width of one (1) inch shall be placed around each wheel housing, the driver's platform and the dash panel to seal the floor covering. A two (2)-inch, straight line nosing must be maintained ± ½" where nosings are to be furnished on entrance and exit steps. Step nosings</p>		

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	<p>shall be safety yellow. The standee line shall be furnished at the rear of the operator's platform and shall be at least 2 inches wide and shall extend across the bus aisle. This line shall be white. Color / pattern shall be consistent throughout the floor covering. Color and material of the floor covering shall be subject to approval by the Procuring Agency.</p> <p>Any areas on floor, which are not intended for standees, such as areas "swept" during passenger door operation, shall be clearly and permanently marked.</p> <p>The floor in the operator's compartment shall be easily cleaned and shall be arranged to minimize debris accumulation.</p>		
<p>3.53 Passenger Interior Lighting</p>	<p>PASSENGER INTERIOR LIGHTING</p> <p>An overhead LED lighting system shall provide general illumination in the passenger compartment and shall be controlled independent of the run switch. The interior lighting system shall provide a minimum 15 foot-candle illumination on a 1 square foot plane at an angle of 45 degrees from horizontal, centered 33 inches above the floor and 24 inches in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be 7 foot-candles. Floor surface in the aisles shall be illuminated a minimum of 10 foot-candles, vestibule area a minimum of 4 foot-candles with the front doors open and a minimum of 2 foot-candles with the front doors closed. The front entrance area and curb lights shall illuminate when the front door is open and master run switch is in the "Lights" positions. Rear exit area and curb lights shall illuminate when rear door is unlocked.</p> <p>The light source shall be located to minimize windshield glare with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. Light source on second and third lights curb-side shall be tinted to reduce glare. Lighting shall have dimming features.</p> <p>Lens material shall be clear polycarbonate. Lens shall be designed to effectively "mask" the light source. Lenses shall be sealed to inhibit incursion of dust and insects yet are easily removable for service. If threaded fasteners are used they must be held captive in the lens. Access panels shall be provided to allow servicing of components located behind light panels. If necessary, the entire light fixture shall be hinged.</p> <p>When the master switch is in the RUN or NITE/RUN mode, the first light module on each side of the coach shall automatically extinguish or dim when the front door is in the closed position and illuminate when the door is opened.</p> <p>The light system shall be designed to form part of/or the entire air conditioning duct. The light fixtures shall meet or exceed the standards for Fire Retardancy FMVSS 302 and ASTM-E 162, Surface Flammability, Flame Spread Index F-5<150, Docket 90-A. Test data required.</p> <p>Step lighting for the intermediate platform between lower and upper floor levels shall be provided and shall illuminate in all engine run positions. The step lighting shall be low profile to minimize tripping and snagging hazard for passengers and shall be shielded as necessary to protect passengers' eyes from glare. Step lighting shall be LED.</p>		

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<p>3.54 Fare Collection</p>	<p>FARE COLLECTION</p> <p>Space, as far forward as practicable and structural provisions shall be made for installation of currently available fare collection device(s). Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs using the front door loading device, and shall allow the operator to easily reach the coin drop levers and to view the change platform. The fare box shall not restrict access to the operator area, shall not restrict operation of operator controls and shall not restrict operator's field of view per SAE Recommended Practice J1050. Location and mounting of fare collection device shall allow use, without restriction, by passengers. Fare box location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the fare box shall be readable on a daily basis. A 15-amp minimum, 12-volt, DC, protected circuit shall be available to power the fare box. This power service shall include a grounded lead with both wires enclosed in a flexible conduit. The floor under the fare box shall be reinforced, as necessary, to provide a sturdy mounting platform and to prevent shaking of the fare box. The farebox light shall be activated by the door controller when in the NITE/RUN position: on when open; off when closed. The fare box, including make, model, mounting provisions, size, weight, and meter locations, will be specified by the Procuring Agency.</p>		
<p>3.55 Access Panel and Doors</p>	<p>ACCESS PANELS AND DOORS – INTERIOR</p> <p>Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Doors shall be of rugged construction and shall be capable of withstanding severe abuse. Removal of fixtures or equipment unrelated to the repair task to gain access shall be minimized. Access doors shall be hinged with gas props or over-center springs, where practical, to hold the doors out of the mechanic's way. Panel fasteners shall be standardized so that only one tool is required to service all special fasteners within the bus.</p> <p>Access doors for the door actuator compartments shall be secured with hand screws or latches, and shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.</p> <p>Access openings in the floor shall have reusable/replaceable seals to prevent entry of fumes and water into the bus interior. Flooring material shall be flush with the floor and shall be edge-bound with stainless steel, or aluminum, to prevent the edges from coming loose. Access openings shall be asymmetrical so that reinstalled flooring shall be properly aligned. Fasteners shall tighten flush with the floor. Latch construction shall preclude damage to latches by the removal and installation of access doors. Access doors shall by design not trap dirt and debris. Access doors shall have a provision to be opened without prying. The destination sign access door shall be secured using aircraft type latches or knurled knobs.</p>		

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<p>3.56 Passenger Seating</p>	<p>PASSENGER SEATING</p> <p>Arrangements and Seat Style The passenger seating arrangement in the bus shall be such that seating capacity is maximized and in compliance to the following requirements. The Procuring Agency recognizes that ramp location, foot room, hip-to-knee room, doorway type and width, seat construction, floor level type, seat spacing requirements, etc. ultimately affect seating capacity and layout.</p> <p>The passenger seats shall be composite resin with non-padded fabric inserts. The general design of the seat structure shall provide optimum comfort for the passenger. All seats shall have vandal-resistant fabric inserts installed in a tamper proof manner. All cushion and back inserts shall be recessed into the seat assembly. All workmanship shall be of the highest quality providing component consistency and freedom from such defects as sharp edges, misaligned sections, etc. Inserts are to fit the shell perfectly to preclude tampering or rattles, and to exclude dirt from entering the insert-shell interface. Seat suspension shall be designed to preclude seat/wall rattles over the life of the bus. Seat assemblies and components of identical seats shall be mechanically interchangeable.</p> <p>All transverse seats shall be cantilever type mounting, except in the rear section, rigid enough to prevent pinch hazards between the frame and interior side walls. The hardware shall be stainless steel. The rear section seating may consist of a combination of cantilever and pedestal type mounting. The back of each transverse seat shall incorporate a handhold no less than 7/8" in diameter for standees and seat ingress/egress. The handhold shall not be a safety hazard during severe decelerations. The overall design of the grabrail shall be aesthetically pleasing and enhance the general appearance of the seat.</p> <p>Passenger seats shall be arranged in a transverse, forward facing configuration, except at the rear wheel housings where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at wheelchair securement areas and platforms (such as for fuel tank storage space).</p> <p>Passenger seating capacity with this arrangement shall be no less than 39 seated passengers in the 40-foot bus, 30 seated passengers in the 35-foot bus and 23 seated passengers in the 30-foot bus, not including the operator, with the specified seating arrangement.</p> <p>Hip-to-knee room, measured from the front of one seat back horizontally across the highest part of the seat to the seat or panel immediately in front, shall be no less than 26 inches. At all seating positions in paired transverse seats immediately behind other seating positions hip-to-knee room shall be no less than 26.5 inches.</p> <p>Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 inches. Seats immediately behind the wheel housings and modesty panels may have foot room reduced, provided the wheelhouse is shaped so that it may be used as a footrest or the design of modesty panel effectively allows for foot room.</p>		
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	<p>Thickness of the transverse seat backs shall be minimized at the bottom to increase passenger knee room and passenger capacity. The area between the longitudinal seat backs and the attachment to the bus sidewalls shall be designed to prevent debris accumulation.</p> <p>The aisle between the seats shall be no less than 20 inches wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 inches at standing passenger hip height.</p> <p>Raised platforms for passenger seats shall not be allowed without Procuring Agency's approval. If vehicle is of a sloped floor design, then raised platforms for passenger seats may be provided in the rear sloped section.</p> <p>Offeror(s) shall submit a copy of the proposed seat layout consistent with these specifications showing hip-to-knee and foot room dimensions, stanchion layout and wheelchair maneuverability layout prior to submission of proposals for Procuring Agency review and approval. Offeror(s) shall also indicate on this layout the Free Floor Space available to standees and include the calculation of the Free Floor Space area.</p>		
<p>3.57 Seating Dimensions</p>	<p>Seat dimensions for the various seating arrangements shall have the dimensions as follows (refer to the figure above):</p> <p>The width, W, of the seat shall be 35 inches.</p> <p>The length, L, shall be 17 ± 1 inches.</p> <p>The seat back height, B, shall be a minimum of 15 inches.</p> <p>The seat height, H, shall be 17 ± 1 inches. For the rear lounge (or settee) and longitudinal seats, and seats located above raised areas for storage of under floor components, a cushion height of up to 18 ± 2 inches will be allowed. This shall also be allowed for limited transverse seats, but only with expressed approval of the Procuring Agency.</p> <p>The foot room, F, is specified herein.</p> <p>The seat cushion slope, S, shall be between 5° to 11°.</p> <p>The seat back slope, C, shall be between 8° to 17°.</p> <p>The hip to knee room, K, shall be as specified herein</p> <p>The pitch, P, is shown as reference only.</p>		

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<p>3.58 Seating Structure and Design</p>	<p>Structure and Design</p> <p>The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized to increase wheelchair maneuvering room and is completely free of obstructions to facilitate cleaning.</p> <p>The transverse seat structure shall be fully cantilevered from the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12 inches of the aisle shall be at least 10 inches above the floor. Folding seats used in wheelchair securement areas, as well as, transverse seats mounted in locations at which cantilevered installation is precluded by design and/or structure, need not be cantilevered.</p> <p>The underside of the seat and the sidewall shall be configured to prevent debris accumulation and the transition from the seat underside to the bus sidewall to the floor cove radius shall be smooth. All transverse objects, including seat backs, modesty panels, and longitudinal seats, in front of forward facing seats shall not impart a compressive load in excess of 1,000 pounds onto the femur of passengers ranging in size from a 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at $.05 \pm .015$ seconds from initiation. Permanent deformation of the seat resulting from two 95th-percentile males striking the seat back during this 10g deceleration shall not exceed 2 inches, measured at the aisle side of the seat frame at height H. Seat back should not deflect more than 14 inches, measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.</p> <p>The seat assembly shall withstand static vertical forces of 500 pounds applied to the top of the seat cushion in each seating position with less than ¼-inch permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 pounds evenly distributed along the top of the seat back with less than ¼-inch permanent deformation in the seat or its mountings. The seat backs at the aisle position and at the window position shall withstand repeated impacts of two 40-pound sandbags without visible deterioration. One sandbag shall strike the front 40,000 times and the other sandbag shall strike the rear 40,000 times. Each sandbag shall be suspended on a 36-inch pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10, and 12 inches. Seats at both seating positions shall withstand 4,000 vertical drops of a 40-pound sandbag without visible deterioration. The sandbag shall be dropped 1,000 times each from heights of 6, 8, 10, and 12 inches. Seat cushions shall withstand 100,000 randomly positioned 3½ inch drops of a squirring, 150-pound, smooth-surfaced, buttocks-shape striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.</p> <p>The back of each transverse seat shall incorporate a handhold no less than 7/8-inch in diameter for standees and seat access/egress. The handhold shall not be a safety hazard during severe decelerations. The handhold shall extend above the seat back near the aisle so that standees shall have a convenient vertical assist, no less than 4 inches long that may be grasped with the full hand. This handhold shall not cause a standee using this assist to interfere with a seated 50th-percentile male passenger. The handhold shall also be usable by a 5th-percentile female, as well as by larger passengers, to assist with seat access/egress for either transverse seating position. The upper rear portion of the seat back and the seat back handhold immediately forward of transverse seats shall be padded and/or constructed of energy absorbing materials.</p>		
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	<p>During a 10g deceleration of the bus, the HIC number (as defined by SAE Standard J211a) shall not exceed 400 for passengers ranging in size from a 6 year old child through a 95th percentile male. The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where vertical assist is provided. Armrests shall not be included in the design of transverse seats.</p> <p>Longitudinal seats shall be the same general design as transverse seats but without seat back handholds. Longitudinal seats may be mounted on the wheelhouses. Armrests shall be included on the ends of each set of longitudinal seats except on the forward end of a seat set that is immediately to the rear of a transverse seat, the operator's barrier, or a modesty panel and these fixtures perform the function of restraining passengers from sliding forward off the seat. Armrests are not required on longitudinal seats located in the wheelchair parking area that fold up when the armrest on the adjacent fixed longitudinal seat is within 1½ to 3½ inches of the end of the seat cushion. Armrests shall be located from 7 to 9 inches above the seat cushion surface. The area between the armrest and the seat cushion shall be closed by a barrier or panel. The top and sides of the armrests shall have a minimum width of 2 inches and shall be free from sharp protrusions that form a safety hazard.</p> <p>Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 pounds applied anywhere along their length with less than ¼-inch permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 pounds with less than ¼-inch permanent deformation and without visible deterioration.</p> <p>At the Procuring Agency's request, a test report shall be provided by the bidder that fully documents compliance with all the requirements defined above. The test report shall contain a record of all testing activities, test diagrams, testing equipment, as well as test data related to loads, deflections and permanent deformation of the seat assembly. The report shall include a statement of compliance with the requirements of this section of Part 5: Technical Specifications. The rear seat shall be hinged to allow access to the engine compartment. A prop rod shall be installed to hold the seat in an upright position when the seat is raised.</p>		
<p>3.59 Seating Construction and Materials</p>	<p>Construction and Materials Seat shall be constructed with materials that comply with the physical test. Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamperproof fasteners. Coloring shall be consistent throughout the seat material, with no visually exposed portion painted. All visually exposed metal of the standard seat structure including mounting brackets and other components shall be aluminum or stainless steel. The seat and back inserts shall be contoured for individuality, lateral support, and maximum comfort and shall fit the framework to reduce exposed edges.</p> <p>Seats inserts shall be securely attached and shall be detachable by means of a simple release mechanism employing a special tool so that they are easily removable by the maintenance staff but not by the passengers. To the extent practicable, seat inserts shall be interchangeable throughout the bus. The inserts shall be injection molded or fiberglass construction.</p>		

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	<p>The minimum radius of any part of the seat back, handhold, or modesty panel in the head or chest impact zone shall be a nominal ¼ inch. Seat covering materials shall be selected on the basis of durability, ease of maintenance, and pleasing texture and appearance. The upholstery material shall come into contact with the seat frame to maximize the amount of upholstered surface that is in contact with the seated passenger. The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy absorbing materials to provide passenger protection and, in a severe crash, allow the passenger to deform the seating materials in the impact areas in accordance with the Knee Impact and Head Impact Criteria requirements of Section 5.4.5.1.3. Complete seat assemblies shall be interchangeable to the extent practicable. The bidder must provide information on the proposed seat with Proposal submission. Color, fabrics and patterns for the seats and trim will be subject to the Procuring Agency's approval. Upholstery color will be selected after award of contract.</p>		
<p>3.60 Passenger Assists General</p>	<p>PASSENGER ASSISTS</p> <p>General Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for the safety of standees and for ingress/egress. Passenger assists shall be convenient in location, shape, and size for both the 95th-percentile male and the 5th-percentile female standee. Starting from the entrance door and moving anywhere in the bus and out the exit door, a vertical assist shall be provided either as the vertical portion of seat back assist or as a separate item so that a 5th-percentile female passenger may easily move from one assist to another using one hand and the other without losing support. All handholds and stanchions shall be brush finish stainless steel. All associated hardware shall be stainless steel. All clamps shall be stainless steel.</p> <p>Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1½ inches or shall provide an equivalent gripping surface with no corner radii less than ¼ inch. All passenger assists shall permit a full hand grip with no less than 1½ inches of knuckle clearance around the assist. A crash resulting in a 1-foot intrusion shall not produce sharp edges, loose rails, or other potentially dangerous conditions associated with a lack of structural integrity of the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.</p> <p>Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Passenger assists shall be designed to minimize glare in the Operator's area to the extent possible. With the exception of seat and door handholds, all areas of the passenger assists that are handled by passengers including functional components used as passenger assists shall be of stainless steel. Seat handholds may be of the same construction and finish as the seat frame. Door mounted passenger assists shall be of anodized aluminum, stainless steel, or powder coated metal. Connecting tees and angles may be powder coated metal castings. Assists shall withstand a force of 300 pounds applied over a 12-inch lineal dimension in any direction normal to the assist without permanent visible deformation. All passenger assist components, including brackets, clamps, screw heads, and other fasteners used on the passenger assists shall be designed to eliminate pinching,</p>		

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	snagging and cutting hazards and shall be free from burrs or rough edges.		
3.61 Front Doorway	<p>Front Doorway Front doors, or the entry area, shall be fitted with ADA compliant assists. Assists shall be as far outward as practicable, but shall be located no farther inboard than 6 inches from the outside edge of the entrance step and shall be easily grasped by a 5th-percentile female boarding from street level. Door assists shall be functionally continuous with the horizontal front passenger assist and the vertical assist and the assists on the wheel housing or on the front modesty panel.</p>		
3.62 Vestibule	<p>Vestibule The aisle side of the operator's barrier, the wheel housings, and when applicable the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend to within 36 inches of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm.</p> <p>A horizontal passenger assist shall be located across the front of the bus and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the fare collection procedure. Passengers shall be able to lean against the assist for security while paying fares. The assist shall be no less than 36 inches above the floor. The assists at the front of the bus shall be arranged to permit a 5th-percentile female passenger to easily reach from the door assist, to the front assist, to vertical assists on the operator's barrier, wheel housings, or front modesty panel.</p>		
3.63 Rear Doorway	<p>Rear Doorway Vertical assists that are functionally continuous with the overhead assist shall be provided at the aisle side of the transverse seat immediately forward of the rear door and on the aisle side of the rear door modesty panel(s). Rear doors, or the exit area, shall be fitted with assists no less than ¾ inch in width and shall provide at least 1½ inches of knuckle clearance between the assists and their mounting. The assists shall be designed to permit a 5th-percentile female to easily move from one assist to another during the entire exiting process. The assists shall be located no farther inboard than 6 inches from the outside edge of the rear doorway.</p>		
3.64 Overhead Assists	<p>Overhead Except forward of the standee line and at the rear door, a continuous, full grip, overhead assist with grab straps shall be provided. This assist shall be convenient to standees anywhere in the bus and shall be located over the center of the aisle seating position of the transverse seats. The assist shall be no less than 70 inches above the floor. Overhead assists shall simultaneously support 150 pounds on any 12-inch length. No more than 5 percent of the full grip feature shall be lost due to assist supports.</p>		

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	<p>Straps or shall be provided for sections where vertical assists are not available and for the use by passengers that can not reach to 70 inches. A minimum of three (3) overhead vertical assist straps per side shall be provided. Exact number of straps shall be determined based on clear floor space of 1.5 square feet per passenger in the area where vertical stanchions are not available, (usually the C/S and S/S wheelchair areas). Vertical assist straps shall be constructed of flexible vinyl covered nylon webbed material a minimum of one inch (1") wide and be of sufficient construction to withstand the rigors of daily use in transit service.</p>		
<p>3.65 Longitudinal Seats</p>	<p>Longitudinal Seats Longitudinal seats shall have vertical assists located between every other designated seating position, except for seats that fold/flip up to accommodate wheelchair securement. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. Assists shall be staggered across the aisle from each other where practicable and shall be no more than 52 inches apart or functionally continuous for a 5th percentile female passenger.</p>		
<p>3.66 Wheel Housing Barriers/Assists</p>	<p>Wheel Housing Barriers/Assists Unless passenger seating is provided on top of wheel housing, passenger assists shall be mounted around the exposed sides of the wheel housings (and propulsion compartments if applicable) which shall also be designed to prevent passengers from sitting on wheel housings. Such passenger assists shall also effectively retain items, such as bags and luggage, placed on top of wheel housing.</p>		
<p>3.67 Passenger Doors General</p>	<p>PASSENGER DOORS</p> <p>General Two doorways shall be provided on the curb side of the 35 and 40-foot buses for passenger ingress and egress. One front door only is required on the 30-foot bus. The front doorway shall be forward of the front wheels and located so that the operator will be able to collect or monitor the collection of fares. Passenger doors and doorways shall comply with ADA requirements. The rear doorway centerline shall be rearward of the point midway between the front door centerline and the rearmost seat back. The door style for all doors shall be slide glide.</p> <p>The rear door actuation system shall be supervised by an electronically controlled Sonar field regulated system that shall control the stop and reverse functionally without the door panel coming into physical contact with passengers. This system upon actuation shall operate as a standard impulse contact system. There shall be no lower panel area tape switches.</p> <p>Durable rubber weather stripping two to three (3) inches in width shall be provided on each mating edge of the forward panels. Rubber weather stripping on the rear door panels shall have sensitive edge sensors in the stripping.</p>		

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	<p>Doors shall be air-operated and under the direct control of the operator. The operator's door control shall be mounted on the operator's left side panel.</p> <p>A manually operated door-bleed valve located at the operator's left side, in an easily accessible position, shall be installed. It will release air pressure on the front door if the control valve becomes inoperative, allowing the front door to open manually.</p> <p>The rear door shall be activated with the operator controlling the opening and closing of the rear door using door control switch. The door shall begin closing from "full open" position in operator operated mode within 2.0 - 2.5 seconds. The door closing speed shall be easily adjustable from the door mechanism compartment. The rear door emergency release valve shall be situated at the rear door at a location approved by Procuring Agency.</p> <p>The front and rear door operating system shall include a brake interlock system and an accelerator interlock system. The front and rear door operating system shall also include a door inhibit system (low speed switch) which shall prevent the doors from actually opening unless the bus has come to a complete stop (0-2 mph). To preclude movement of the vehicle, the interlock system shall not release until the door cycle is completed and the door is positively closed and locked.</p> <p>The rear door cut-out switch shall be located behind the front destination door. The rear door cut-out switch shall inhibit rear door operation and override the rear door interlock system. An alarm shall sound and a tell tail light shall illuminate on the driver's dash panel indicating that the cut-out switch is activated.</p>		
<p>3.68 Materials and Construction</p>	<p>Materials and Construction Structure of the doors, their attachments, inside and outside trim panels, and any mechanism exposed to the elements shall be corrosion-resistant. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. The doors, when fully opened, shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. The front leaves of the passenger doors shall overlap the rear leaves.</p>		
<p>3.69 Transit Bus Door Opening</p>	<p>The front door clear width shall be no less than 32 inches with the doors fully opened. The rear door clear width shall be no less than 30 inches with the doors fully opened. When open, the doors shall leave an opening no less than 76 inches in height.</p> <p>See Attachment I</p>		
<p>3.70 Door Glazing</p>	<p>Door Glazing The upper section of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section. The edge of a 6-inch high curb shall be visible to the seated operator through the closed front door when the bus is more</p>		

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	<p>than 12 inches from the curb.</p> <p>The front door panel glazing material shall have a nominal ¼ inch or 6 mm thick laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673. All door glazing shall be fitted with dry seal gasketing.</p> <p>Glazing material in the upper portion of the rear doorway door panels shall be the same material, thickness and color as the side windows. There should be no glazing in the lower half of the rear doorway.</p>		
<p>3.71 Door Projection</p>	<p>Door Projection</p> <p>Exterior projection of the doors shall be minimized and shall not exceed 13 inches during the opening or closing cycles or when doors are fully opened. Projection inside the bus shall not exceed 21 inches. The closing edge of each door panel shall have no less than 2 inches of soft weather stripping. The doors, when closed, shall be effectively sealed to prevent the entrance of air, water objectionable noise and keep ice/snow from forming on the ingress/egress step edge. The hard surfaces of the doors shall be at least 4 inches apart. Requirements for sensitive door edges.</p>		
<p>3.72 Door Height above Pavement</p>	<p>Door Height Above Pavement</p> <p>It shall be possible to open and close either passenger door when the bus loaded to GVWR is not knelt and parked with the tires touching an 8-inch-high curb on a street sloping toward the curb so that the street side wheels are 5 inches higher than the right side wheels.</p>		
<p>3.73 Closing Force</p>	<p>Closing Force</p> <p>Closing door edge speed shall not exceed 19 inches per second. Power close rear doors shall be equipped with a sensitive edge or other obstruction sensing system such that if an obstruction is struck by a closing door edge, the doors will stop and/or reverse direction prior to imparting a 10-pound force on 1 square inch of that obstruction. If the device senses an obstruction when operating on its closing cycle, the system shall be configured to stop and reverse the doors to a locked open condition. During the aforementioned obstruction sense condition, an alarm shall activate so long as the condition exists at the sensitive edges. If the door safety system operates under these conditions, the operator must proceed through a reopen-reclose cycle at the switch in order to close the doors. Whether or not the obstruction sensing system is present or functional it shall be possible to withdraw a 1½ inch diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 pounds.</p>		

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<p>3.74 Actuators</p>	<p>Actuators</p> <p>Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be able to be rebuilt. If powered by compressed air, exhaust from the door system shall be routed below the floor of the bus to prevent accumulation of any oil that may be present in air system and to muffle sound.</p>		
<p>3.75 Door Emergency Operation</p>	<p>Emergency Operation</p> <p>In the event of an emergency, it shall be possible to open the doors manually from inside the bus using a force of no more than 25 pounds after actuating an unlocking device at each door. The unlocking devices shall be clearly marked as an emergency-only device and shall require two distinct actions to actuate. The respective door emergency unlocking device shall be accessible from the entrance and exit areas. When the rear door emergency device is actuated, the door interlock throttle system shall return the engine to idle and the door interlock brake system shall apply to stop the bus. When the front door emergency device is actuated only the door interlock throttle system shall be actuated. Locked doors shall require a force of more than 100 pounds to open manually. When the locked doors are manually forced to open, damage shall be limited to the bending of minor door linkage with no resulting damage to the doors, engines, and complex mechanism.</p> <p>The rear doors shall be equipped with sensitive edge alarms. This alarm shall be active from door open to approximately 2% of door close. There shall also be an audible alarm and light when the doors are closed to alert the driver when someone is trying to force doors open.</p>		
<p>3.76 Automatic Passenger Counting System</p> <p>General</p>	<p>Automatic Passenger Counting System (APC) - General Requirements</p> <p>Contractor shall provide and install a Dilax Automatic Passenger Counting System (APC) system with a Dilax PCU-100 installed in the secure diagnostic center, an IRS-320 sensor in each doorway and associated cabling. These installations should be completed per the manufacturer's specifications. If possible, the APC system should utilize the J-1939, Bus LAN if possible.</p>		
<p>3.77 Accessibility Provisions</p> <p>General</p>	<p>ACCESSIBILITY PROVISIONS</p> <p>General</p> <p>The design and construction of the bus shall be in accordance with all requirements defined in 49 CFR, Part 38, Subpart B: ADA Accessibility Specifications for Transportation Vehicles - Buses, Vans and Systems. Space and body structural provisions shall be provided at the front door of the bus to accommodate the wheelchair loading ramp. Specific requirements, including the number of wheelchairs to be accommodated, the tiedown and securement devices, and fold-down seats, are provided in attachments to in the Technical Specifications. Prior to submission of bid, the Contractor shall provide a plan, including layout drawings for entry, maneuvering, parking, and exiting of wheelchair passengers, to show compliance with ADA regulations.</p>		

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<p>3.78 Loading System</p>	<p>Loading System An operator-controlled, power-operated ramp system compliant with the requirements defined in 49 CFR Part 38, Subpart B, §38.23c, shall provide ingress and egress quickly, safely and comfortably, both in forward and rearward directions, for a passenger in a wheelchair from a level street or curb. The wheelchair loading system shall be located at the front door. The ramp shall be of a simple hinged, flip-out type design. The wheelchair ramp shall be rated for a minimum capacity of 600 lbs. The ramp shall have a clear width of not less than 30.5 inches and be equipped with side barriers at least two inches high. The ramp shall be illuminated.</p> <p>When the system is not in use, the passageway shall appear normal. In the stored position of the ramp, no tripping hazards shall be presented and any resulting gaps shall be minimized. The ramp control (hood guarded toggle switch) shall be located on the operator's dash panel and shall be simple to operate with no complex phasing operations required. The loading system operation shall be under the surveillance and complete control of the operator. Ramp controls will be operational only when the propulsion system is in neutral, the parking brake is set and the front doors are open. The ramp logic shall be programmed to kneel the bus prior to ramp deployment. When "ramp deployment" is activated the bus shall kneel prior to the ramp deployment. When "ramp-stow" is activated the ramp shall stow completely prior to the kneeler recovery. The kneel function will be disabled when the platform is extended. To alert passengers and pedestrians, an audible alarm will sound and a minimum 2.5 inch diameter LED lamp will flash as the ramp is being extended or retracted. The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The wheelchair loading system shall not present a hazard, nor inconvenience any passenger. The loading system shall be inhibited from retracting or folding when a passenger is on the ramp/platform. The hazard lamps shall flash automatically upon activation of the ramp. The hazard lamps shall continue to flash throughout the ramp operation cycle until the ramp is fully stowed.</p> <p>A passenger departing or boarding via the ramp shall be able to easily obtain support by grasping the passenger assist located on the doors or other assists provided for this purpose. The platform shall be designed to protect the ramp from damage and persons on the sidewalk from injury during the extension/ retraction or lowering/raising phases of operation. The loading platform shall be covered with a replaceable or renewable, nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading. Deployment or storage of the ramp shall require no more than 15 seconds. The device shall function without failure or adjustment for 500 cycles or 50,000 miles in all weather conditions on the design operating profile when activated once during the idle phase. A manual override system easily usable by the operator shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 32 lbs. of force and shall be accomplished within 3 minutes, start to finish without the use of pumps or tools other than a pull handle/strap. Hydraulic systems incorporated in the loading system mechanism shall comply with the requirements in the Technical Specifications. The ramp assembly components shall be replaceable within 30 minutes by a 3M mechanic.</p>		
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<p>3.79 Wheelchair Accommodations</p>	<p>Wheelchair Accommodations The vehicle shall be equipped with 2 forward facing wheelchair securement areas with a "clear floor space" no less than 50 inches long and 30 inches wide if the proposed seat layout allows. These areas shall be clearly marked as wheelchair securement areas and signs will request other passengers to make them available for wheelchair use.</p> <p>The wheelchair securement system shall feature a four-point tie down system to limit the movement when secured and have the capability to secure a wheel chair passenger in one and half minutes or less. The tie-downs shall include 4 retractable and permanently affixed belts to secure the wheelchair. The front restraint belts shall be attached or fitted to a telescoping bar or arm that shall not pose an aisle space restriction or standing passenger hazard when the telescoping unit is not being used by a wheelchair passenger. The telescoping arm shall be permanently attached to the floor at each Wheelchair restraint location. The restraint belts shall be retractable and include knobs to draw down and lock the front restraint belts. The restraint belt system shall be USSC VPRO, AmSeCo ARM or approved equal.</p> <p>Permanently mounted and retractable passenger lap and shoulder belts will be provided. The harness and lap belts shall interlock with a single point quick release. In their stowed position the restraint belts along with the lap and shoulder belts will not contact the floor of the bus. A retainer shall be provided to stow the shoulder harness locking end when not in use.</p> <p>Folding seats shall be provided in the wheelchair securement areas to allow the areas to be used as normal seat locations when not in use for wheelchair securement. The seats shall not be spring-loaded. The design of the seat shall be such that folding and unfolding of the seat can be easily accomplished by an occupant of a wheelchair. The bottom side of the folding seat assemblies shall be covered with textured aluminum or stainless steel, to which an instruction plate shall be attached, showing step by step procedures for the proper securement of the wheelchair.</p> <p>A chime tape switch shall be attached to the bottom of each longitudinal folding seat or seat assembly. The tape shall be conveniently located for the user. The tape switches shall simultaneously sound a double chime and illuminate a "WC STOP REQUEST" lamp on the dash to alert the operator to the pending departure of the wheelchair passenger.</p>		
<p>3.80 Interior Circulation</p>	<p>Interior Circulation Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device through the bus to the designated parking area, and back out. No portion of the wheelchair or its occupant shall protrude into the normal aisle of the bus when parked in the designated parking space(s). As a guide, no width dimension should be less than 34 inches. Areas requiring 90-degree turns of wheelchairs should have a clearance arc dimension no less than 45 inches and in the parking area where 180-degree turns are expected, space should be clear in a full 60-inch-diameter circle. A vertical clearance of 12 inches above the floor surface should be provided on the outside of turning areas for wheelchair footrest.</p>		

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<p>3.81 ADA Priority Seating</p>	<p>Passenger Information ADA priority seating signs as required and defined by 49 CFR, Part 38.27 shall be provided to identify the seats designated for passengers with disabilities.</p> <p>Requirements for a public information system in accordance with 49 CFR, Part 38.35 shall be provided as required.</p> <p>Requirements for a stop-request passenger signal in accordance with 49 CFR, Part 38.37 shall be provided as required.</p> <p>Requirements for exterior destination signs in accordance with 49 CFR, Part 38.39 shall be provided as required.</p>		
<p>3.82 Operator's Area</p>	<p>OPERATOR'S AREA</p> <p>General The operator's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be matte black or dark gray in color wherever possible to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the operator's area shall be avoided. Such objects include dash panels, switches and controls, cowlings, windshield wipers and arms, barriers and modesty panels, fare stanchions, access panels and doors, fasteners, flooring, ventilation and heating ducting, window and door frames, and visors. The operator shall control interior lighting located ahead of the standee line.</p>		
<p>3.83 Visors</p>	<p>Visors Adjustable pull-down fabric sun visor(s) shall be provided for the windshield and the operator's side window. Visors shall be shaped to minimize light leakage between the visor and windshield pillars. Visors shall store out of the way and shall not obstruct airflow from the climate control system or interfere with other equipment such as the radio handset or the destination control. Deployment of the visors shall not restrict vision of the rearview mirrors. Visor adjustments shall be made easily by hand. Sun visor construction and materials shall be strong enough to resist breakage during adjustments. Visors, when deployed, shall be effective in the operator's field of view at angles more than 5 degrees above the horizontal.</p>		
<p>3.84 Operator's Controls</p>	<p>Operator's Controls All switches and controls necessary for the operation of the bus shall be conveniently located in the operator's area and shall provide for ease of operation. Switches and controls shall be essentially within the hand reach envelope described in SAE Recommended Practice, J287, Driver Hand Control Reach. Controls shall be located so that boarding passengers may not easily tamper with control settings.</p>		

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	<p>Accelerator and brake pedals shall be designed for ankle motion. Foot surfaces of the pedals shall be faced with wear-resistant, nonskid, replaceable material.</p> <p>Controls for engine operation shall be closely grouped within the operator's compartment. These controls shall include separate master run switch and start switch or button. The run switch shall be a four-position rotary switch with the following functions:</p> <p><i>OFF All electrical systems off, except power available for the passenger interior lighting, stoplights, turn lights, hazard lights, silent alarm, horn, fare box, fire detection equipment, engine compartment lights, auxiliary heater, if provided and electronic equipment that require continuous energizing. If the bus is not operated for a period of 3 days, the total electric load due to devices that require continuous energizing shall not cause the battery to be discharged below the level necessary to start the engine. The electrical load resulting from the Procuring Agency's devices, such as, farebox, GPS, radio, etc., shall not exceed 1.5 amps with master run switch in OFF position.</i></p> <p>DAY/RUN All electrical systems and engine on, except the headlights, parking lights and marker lights. Daytime running lights (DRL), if provided, shall be on.</p> <p>NITE/RUN All electrical systems and engine on.</p> <p>PARK All electrical systems off, except those listed in OFF and power to destination signs, interior lights, radio and marker lights.</p> <p>The door control, kneel control, windshield wiper/washer controls, mirror control and run switch shall be in the most convenient operator locations. They shall be identifiable by shape, touch, and permanent markings. Doors shall be operated by a single control, conveniently located and operable in a horizontal plane by the operator's left hand. The setting of this control shall be easily determined by position and touch. Turn signal controls shall be floor-mounted, foot-controlled, waterproof, heavy-duty, momentary contact switches.</p> <p>All panel-mounted switches and controls shall be marked with easily read identifiers and shall be replaceable, and the wiring at these controls shall be serviceable from the vestibule or the operator's seat. Switches, controls, and instruments shall be dust- and water-resistant consistent with the bus washing practice.</p>		
<p>3.85 Door Controls</p>	<p>Door Control Doors shall open or close completely in not more than 3.5 seconds from the time of control actuation and shall be subject to the closing force requirements and the adjustment requirements. The door control shall be a lever that rotates around a vertical staff. The lever shall be located on the street side of the operator's area approximately 16 inches to the street side of the operator's seat centerline, forward of the seat, and approximately 23 inches above the floor in the operator's area. Front door shall remain in commanded state position even if power is removed or lost.</p>		

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	<p>Operation of, and power to, passenger doors shall be completely controlled by the operator.</p> <p>A control or valve in the operator's compartment shall shut off the power to, and/or dump the power from, the front door mechanism to permit manual operation of the front door with the bus shut down. A master door switch which is not within reach of the seated operator when set in the "Off" position shall close the doors, deactivate the door control system, release the interlocks, and permit only manual operation of the doors.</p> <p>To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position and a brake interlock shall engage the service brake system when the front and/or rear door control is activated. The braking effort shall be adjustable with hand tools. Rear doors shall not open until bus speed is below 2 m.p.h.</p> <p>There shall be a test port for attaching an air pressure gauge to this system for checking and setting of pressure regulator for brake interlock system.</p>																																															
<p>3.86 Instruments</p>	<p>Instrumentation The speedometer, air pressure gauge(s), and certain indicator lights shall be located on the front cowl immediately ahead of the steering wheel. The steering wheel spokes or rim shall not obstruct the operator's vision of the instruments when the steering wheel is in the straight-ahead position. Illumination of the instruments shall be simultaneous with the marker lamps. Glare or reflection in the windshield, side window, or front door windows from the instruments, indicators, or other controls shall be minimized. Instruments and indicators shall be easily readable in direct sunlight. Indicator lights immediately in front of the operator are identified in the following table.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Visual Indicator</th> <th style="text-align: left;">Audible Alarm</th> <th style="text-align: left;">Condition</th> </tr> </thead> <tbody> <tr> <td>Back-Up</td> <td>Backup Alarm</td> <td>Reverse gear is selected</td> </tr> <tr> <td>Hazard</td> <td>Click</td> <td>Four-way flashers activated</td> </tr> <tr> <td>DRL</td> <td>None</td> <td>Daytime Running Lights</td> </tr> <tr> <td>High Beam</td> <td>None</td> <td>Headlamp high beams activated</td> </tr> <tr> <td>Kneel</td> <td>Kneel Horn</td> <td>Suspension kneeling system activated</td> </tr> <tr> <td>Left Turn Signal</td> <td>Click</td> <td>Left turn signal activated</td> </tr> <tr> <td>Parking Brake</td> <td>None</td> <td>Parking brake is activated</td> </tr> <tr> <td>Rear Door</td> <td>None</td> <td>Rear passenger door is not closed and locked</td> </tr> <tr> <td>Right Turn Signal</td> <td>Click</td> <td>Right turn signal activated</td> </tr> <tr> <td>Stop Request</td> <td>Chime</td> <td>Passenger stop request has been activated</td> </tr> <tr> <td>Wheelchair Request</td> <td>Double Chime</td> <td>Passenger wheelchair lift request has been activate</td> </tr> <tr> <td>Stop Lights</td> <td>None</td> <td>Brake lights activated</td> </tr> <tr> <td>ABS</td> <td>None</td> <td>ABS activated</td> </tr> <tr> <td>Bicycle Rack</td> <td>None</td> <td>Bicycle rack in lowered position</td> </tr> </tbody> </table>	Visual Indicator	Audible Alarm	Condition	Back-Up	Backup Alarm	Reverse gear is selected	Hazard	Click	Four-way flashers activated	DRL	None	Daytime Running Lights	High Beam	None	Headlamp high beams activated	Kneel	Kneel Horn	Suspension kneeling system activated	Left Turn Signal	Click	Left turn signal activated	Parking Brake	None	Parking brake is activated	Rear Door	None	Rear passenger door is not closed and locked	Right Turn Signal	Click	Right turn signal activated	Stop Request	Chime	Passenger stop request has been activated	Wheelchair Request	Double Chime	Passenger wheelchair lift request has been activate	Stop Lights	None	Brake lights activated	ABS	None	ABS activated	Bicycle Rack	None	Bicycle rack in lowered position		
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<p>3.87 Instrument Panel</p>	<p>The instrument panel shall include an electronic speedometer indicating no more than 80 mph and calibrated in maximum increments of 5 mph. The speedometer shall be a rotating pointer type, with a dial deflection of 220 to 270 degrees and 40 mph near the top of the dial. The speedometer shall be sized and accurate in accordance with SAE Recommended Practice J678.</p> <p>The instrument panel shall also include air brake reservoir pressure gauge(s) with indicators for primary and secondary air tanks and voltmeter(s) to indicate the operating voltage across the bus batteries. The instrument panel and wiring shall be easily accessible for service from the operator's seat or top of the panel. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.</p> <p>The speedometer shall be equipped with an odometer with a capacity reading no less than 999,999 miles.</p>																				
<p>3.88 On-Board Diagnostics</p>	<p>On-board Diagnostics The bus shall be equipped with an on-board diagnostic system that will indicate conditions that require immediate action by the operator to avoid an unsafe condition or prevent further damage to the bus. This diagnostic system shall have visual and audible indicators. The indicator system shall be J-1939 signal source and shall provide a means to test all discreet sensors. The diagnostic indicator lamp panel shall be located in clear sight of the operator but need not be immediately in front of him. The intensity of indicator lamps shall permit easy determination of on/off status in bright sunlight but shall not cause a distraction or visibility problem at night. All indicators shall have a method of momentarily testing the operation of the lamp. The audible alarm shall be tamper resistant and shall have an outlet level between 80 and 83 dBA when measured at the location of the operator's ear. Wherever possible, sensors shall be of the closed circuit type, so that failure of the circuit and/or sensor shall activate the malfunction indicator. Malfunction and other indicators listed in the following table shall be supplied on all buses.</p> <p>Space shall be provided on the panel for future installations of no less than 5 additional indicators as the capability of on-board diagnostic systems improves.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Visual Indicator</th> <th style="text-align: left;">Audible Alarm</th> <th style="text-align: left;">Condition or Malfunction</th> </tr> </thead> <tbody> <tr> <td>ABS</td> <td>None</td> <td>ABS System Malfunction</td> </tr> <tr> <td>A/C Stop</td> <td>None</td> <td>Compressor stopped due to high/low pressure or loss of refrigerant</td> </tr> <tr> <td>Check Engine</td> <td>None</td> <td>Engine Electronic Control Unit detects a malfunction</td> </tr> <tr> <td>Check Transmission</td> <td>None</td> <td>Transmission Electronic Control Unit detects a malfunction</td> </tr> <tr> <td>Fire</td> <td>Bell</td> <td>Over-temperature condition in engine compartment</td> </tr> </tbody> </table>	Visual Indicator	Audible Alarm	Condition or Malfunction	ABS	None	ABS System Malfunction	A/C Stop	None	Compressor stopped due to high/low pressure or loss of refrigerant	Check Engine	None	Engine Electronic Control Unit detects a malfunction	Check Transmission	None	Transmission Electronic Control Unit detects a malfunction	Fire	Bell	Over-temperature condition in engine compartment		
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	<p>Generator Stop None Loss of generator output</p> <p>Hot Engine Buzzer Excessive engine coolant temperature</p> <p>Low Air Buzzer Insufficient air pressure in either primary or secondary reservoirs</p> <p>Low Oil Buzzer Insufficient engine oil pressure</p> <p>Low Coolant Buzzer Insufficient engine coolant level</p> <p>Wheelchair Ramp Beeper Wheelchair lift is not stowed and disabled</p>		
3.89 Windshield	<p>WINDSHIELD WIPERS</p> <p>The bus shall be equipped with a variable speed electric windshield wiper for each half of the windshield, with separate controls for each side. A variable intermittent feature shall be provided to allow adjustment of wiper speed for each side between approximately 5 to 25 cycles per minute. No part of the windshield wiper mechanism shall be damaged by manual manipulation of the arms. At 60 mph, no more than 10 percent of the wiped area shall be lost due to windshield wiper lift. Both wipers shall park along the edges of the windshield glass. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service from inside or outside the bus and shall be removable as complete units. The fastener that secures the wiper arm to the drive mechanism shall be corrosion resistant.</p> <p>WINDSHIELD WASHERS</p> <p>The windshield washer system shall deposit washing fluid on the windshield and, when used with the wipers, shall evenly and completely wet the entire wiped area. If powered by compressed air, all fluid shall be purged from the lines after each use of the washers.</p> <p>The windshield washer system shall have a minimum 3-gallon reservoir, located for easy refilling and protected from freezing. Reservoir pumps, lines, and fittings shall be corrosion-resistant, and the reservoir itself shall be translucent for easy determination of fluid level.</p>		
3.90 Operator's Lighting	<p>OPERATOR'S LIGHTING</p> <p>The operator's area shall have a light to provide general illumination and it shall illuminate the half of the steering wheel nearest the operator to a level of 10 to 15 foot-candles. This light shall be operator controlled by a switch on the front or side console.</p>		
3.91 Horn	<p>Horn</p> <p>Two-12 volt horns shall be provided. One horn shall sound a low note and the other a high note. The horns shall meet the audible requirements of The State of Virginia.</p>		
3.92 Operator's Seat	<p>OPERATOR'S SEAT</p> <p>Dimensions The operator's seat shall be comfortable and adjustable so that persons ranging in size from</p>		

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	<p>the 95th-percentile male to the 5th-percentile female may operate the bus. The operator's seat cushion shall have a minimum width of 18 inches, a length of 16 to 18 inches, and rearward slope of 0 to 10 degrees (non-adjustable). The operator's seat back height, measured from the point of intersection of the uncompressed seat cushion with the seat back to the top of the back, shall be 20 ± 2 inches.</p> <p>The angle formed between the seat back and the seat cushion shall be adjustable in the range of 95 to 110 degrees. Height of the seat shall be adjustable so that the distance between the top of the uncompressed seat cushion and the floor may vary between 17 and 21 inches. The seat shall be adjustable forward and rearward for a minimum travel of 7.5 inches. The seat must be equipped with an air track release and a manual track release.</p> <p>While seated, the operator shall be able to make all of these adjustments by hand without complexity, excessive effort, or being pinched. Adjustment mechanisms shall hold the adjustments and shall not be subject to inadvertent changes.</p>		
<p>3.93 Structure and Material</p>	<p>Structure and Materials</p> <p>The operator's seat shall be contoured to provide maximum comfort for extended periods of time. Cushions shall be fully padded with at least 3 inches of neoprene foam, or material with equal properties, in the seating areas at the bottom and back. Upholstery shall be transportation grade fabric.</p> <p>All visually exposed metal on the operator's seat, including the pedestal, shall be painted aluminum or stainless steel. The seat shall have a protective polycarbonate cover to protect the seat back from abuse and contact with the operator's barrier. Track stops, if necessary, shall be supplied to prevent the seat from hitting the operator's barrier.</p> <p style="text-align: center;"><i>Required Type I seat belts shall be fastened to the seat so that the operator may adjust the seat without resetting the seat belt. Seat belts shall be stored in automatic retractors.</i></p> <p>The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210. The seat shall withstand 10,000 impacts of a 40-pound sandbag dropped from a height of 12 inches without visible deterioration. The seat shall be tested in the lowest vertical position and repeated with the seat in the top vertical position.</p> <p>The 40-pound sandbags shall be suspended on a 36-inch pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10, and 12 inches. Seat cushions shall withstand 100,000 randomly positioned 3½-inch drops of a squirring, 150-pound, smooth-surfaced, buttocks-shape striker with only minimal wear on the seat covering.</p> <p>At the request of the Procuring Agency, the Contractor shall provide a certified test report fully documenting compliance with all the requirements defined above. The test report shall contain a record of all testing activities, test diagrams, testing equipment, as well as test data related to loads, deflections and permanent deformation of the seat assembly. The report</p>		

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	<p>shall include a statement of compliance with the requirements of this section of Part 5: Technical Specifications.</p>		
<p>3.94 Exterior Mirrors</p>	<p>Exterior Mirrors The bus shall be equipped with a corrosion-resistant, outside rearview mirror with a combination flat/convex glass mounted on each side of the bus. Mirrors shall permit the operator to view the highway along both sides of the bus, including the rear wheels. Mirrors shall be mounted in a way that minimizes blind spots to the greatest extent possible. The curb-side rearview mirror shall be mounted so that its lower edge is no less than 80 inches above the street surface.</p> <p>The operator shall be able to adjust both mirrors remotely while seated in the driving position. The control for remote positioning of the mirrors shall be a single switch or device per mirror.</p> <p>All exterior mirrors shall be electrically heated. The heaters shall be operated by a switch on the console.</p> <p>Mirrors shall be firmly attached to the bus to prevent vibration and loss of adjustment, but not so firmly attached that the bus or its structure is damaged when the mirror is struck in an accident. Mirrors shall retract or fold sufficiently to allow bus washing operations.</p> <p>The mirror design shall be provided to the Procuring Agency prior to proposal submission for approval.</p> <p>Interior Mirrors</p> <p>Mirrors shall be provided for the operator to observe passengers throughout the bus without leaving his seat and without shoulder movement. With a full standee-load, including standees in the vestibule, the operator shall be able to observe passengers in the front/entrance and rear/exit areas, anywhere in the aisle, and in the rear seats. Inside mirrors shall not be in the line of sight to the right outside mirror.</p>		
<p>3.95 Windows General</p>	<p>GENERAL A minimum of 10,000 square inches of window area, including driver's and door windows, shall be required on each side of the standard configuration 40-foot bus. A minimum of 8,000 square inches of window area, including driver's and door windows, shall be required on each side of the standard configuration 35-foot bus. A minimum of 6,000 square inches of window area, including door windows, shall be required on each side of the standard configuration 30-foot bus.</p> <p>WINDSHIELD The windshield shall not be a single glass unit. The windshield shall be a two (2) piece, streetside and curbside windshield, fitted with a vertically mounted center divider, capable of sealing and holding both windshields fixed securely. The replacement of either windshield shall be accomplished without removal of the other windshield.</p>		

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The windshield shall permit an operator's field of view as referenced in SAE Recommended Practice J1050. The vertically upward view shall be a minimum of 15 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3½ feet high no more than 2 feet in front of the bus. The horizontal view shall be a minimum of 90 degrees above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90-degree requirement, provided that the divider does not exceed a 3-degree angle in the operator's field of view. Windshield pillars shall not exceed 10 degrees of binocular obscuration.

The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus. When the bus is operated at night with the passenger interior lighting on, essentially no reflections shall be visible in the windshield immediately forward of the operator's barrier. Reflections in the remainder of the windshield shall be minimized, and no reflection of any part of the bus interior behind the operator's barrier shall be visible in the windshield.

The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded-in-place windshield shall not be used. The windshield glazing material shall have a ¼-inch or 6 mm nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 1A and the Recommended Practices defined in SAE J673. The glazing material shall have single density tint. The upper portion of the windshield above the operator's field of view shall have a dark, shaded band with a minimum luminous transmittance of 6 percent when tested in accordance to ASTM D-1003.

The front destination sign glass shall be AS-3 ¼" thick heated safety glass. The glass shall be retained with a dry seal, "zip lock" gasket. The glazing shall be masked on the inside in a manner that will allow a view of the sign only.

OPERATOR'S SIDE WINDOW

The operator's side window shall have two vertical sections, each horizontally sliding in tracks or channels designed to last the service life of the bus. The forward section shall be provided with an external handle. Windows shall be designed to preclude opening or closing during acceleration or braking of the bus. The sash frame lower rail shall be designed to drain condensed water accumulated on the window to the bus exterior. The operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single density tint.

The operator's side window glazing material shall have a ¼ inch or 6 mm nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

SIDE WINDOWS

Dimensions

Passenger windows shall extend from the shoulder height of a 5th percentile, seated, female passenger to the eye level of the 95th percentile male standee. Vertical mullions between windows including the trim shall not exceed 10 inches in width.

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	<p>All side windows shall be one-piece fixed panels with operable upper transoms. The transom shall be between 25 and 35 percent of the total window area.</p> <p>All side windows shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent.</p> <p>The windows shall be designed and constructed to enable a 3M mechanic to remove and replace two windows in less than 10 minutes.</p>		
<p>3.96 Side Window Materials</p>	<p>Materials Side windows glazing material shall have a ¼-inch nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.</p> <p>The sash shall be anodized or powder coated aluminum and black in color. A rubber seal attached to the window frame shall achieve weather sealing. The sash construction shall be such that the sash drains will prevent the entrance or backup of water into the bus.</p> <p>All unobstructed side windows shall meet the requirements of FMVSS No. 217: Bus window retention and release. Sash shall be provided with an emergency pushout feature that shall be designed for quick resetting by the operator while the bus is in service. The windows shall be hinged and captive and shall not fall out after being pushed out. The high-force application which is straight perpendicular to window surface as described in FMVSS No. 217, shall have a magnitude between 30 and 60 pounds. In addition, the sash frame shall be installed with a retaining feature which will prevent the sash frame from being released until it is intentionally pushed out. It shall also be equipped with a positive lock device that must be manually released before the window can be pushed out. This device shall be of a sturdy design, not prone to breakage by mishandling.</p> <p>An "Emergency Pushout" instruction plate shall be furnished and installed at each window.</p> <p>Windows on the bus sides and in the rear door shall be tinted a neutral color, complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 37 percent, as measured by ASTM E-424, and the luminous transmittance shall be no less than 16 percent as measured by ASTM D-1003. Windows over the destination signs shall not be tinted.</p>		
<p>3.97 Heating, Ventilation and Air Conditioning (HAVAC)</p>	<p>CAPACITY AND PERFORMANCE The Heating, Ventilation and Air Conditioning (HVAC) climate control system shall be capable of maintaining the interior of the bus at the temperature and humidity levels defined in the following paragraphs.</p> <p>The HVAC unit may either be roof or rear-mounted. Accessibility and serviceability of components shall be provided without requiring maintenance personnel to climb up on the roof of the bus.</p>		

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With the bus running at the design operating profile with corresponding door opening cycle, and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall maintain an average passenger compartment temperature within a range between 65° and 80° F, while controlling the relative humidity to a value of 50 percent or less. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 10° to 95° F and at any ambient relative humidity levels between 5 and 50 percent.

When the bus is operated in outside ambient temperatures of 95° to 115° F, the interior temperature of the bus shall be permitted to rise one degree for each degree of exterior temperature in excess of 95° F.

When bus is operated in outside ambient temperatures in the range of -10° to +10°F, the interior temperature of the bus shall not fall below 55°F while bus is running on the Design Operating Profile.

System capacity testing, including pulldown/warm-up, stabilization and profile, shall be conducted in accordance to the APTA Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System. Temperature measurements shall be made in accordance to this document with the following modifications:

The three primary locations used for temperature probes are (1) 6 inches aft of front wheelhousing, (2) centered between the two axles and (3) 6 inches aft of rear wheelhousing. At each primary location, the nine (9) temperature sensing devices shall be (A) 72 inches above floor level, (B) 6 inches above top surface of seat cushion and (C) 6 inches above floor.

The recommended locations of temperature probes are only guidelines and may require slight modifications to address actual bus design. Care must be taken to avoid placement of sensing devices in immediate path of air duct outlet. In general, the locations are intended to accurately represent the interior passenger area.

Additional testing shall be performed as necessary to ensure compliance to performance requirements stated herein.

The air conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110° to 90° F in less than 20 minutes after engine start-up. Engine temperature shall be within the normal operating range at the time of start-up of the cool-down test and the engine speed shall be limited to fast idle that may be activated by an operator-controlled device. During the cool-down period the refrigerant pressure shall not exceed safe high-side pressures and the condenser discharge air temperature, measured 6 inches from the surface of the coil, shall be less than 45° F above the condenser inlet air temperature. The appropriate solar load as recommended in the APTA "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System," representing 4 P.M. on August 21, shall be used. There shall be no passengers on board, and the doors and windows shall be closed. The air conditioning system shall meet performance requirements using HFC R407C.

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	<p>The climate control blower motors and fan shall be designed such that their operation complies with the interior noise level.</p>								
<p>3.98 Controls and Temperature Uniformity</p>	<p>CONTROLS AND TEMPERATURE UNIFORMITY</p> <p>The HVAC system excluding the driver’s heater/defroster shall be centrally controlled with an advanced electronic/diagnostic control system with provisions for extracting/reading data. Any special equipment required to troubleshoot the system, i.e., reader or tester, shall be provided.</p> <p>After manual selection and/or activation of climate control system operation mode, all interior climate control system requirements for the selected mode shall be attained automatically to within $\pm 2^{\circ}$ F of specified temperature control set-point.</p> <p>The operator shall have full control over the defroster and operator’s heater. The operator shall be able to adjust the temperature in his/her area through air distribution and fans. The interior climate control system shall switch automatically to the ventilating mode if the refrigerant compressor or condenser fan fails.</p> <p>Interior temperature distribution shall be uniform to the extent practicable to prevent hot and/or cold spots. After stabilization with doors closed, the temperatures between any two points in the same vertical plane in the passenger compartment, from 6 inches to 72 inches above the floor, shall not vary by more than 5° F with doors closed.</p> <p>The interior temperatures, measured at the same height above the floor, shall not vary more than $\pm 5^{\circ}$ F, from the front to the rear, from the average temperature determined in accordance to APTA Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System. Variations of greater than $\pm 5^{\circ}$ F will be allowed for limited, localized areas provided the majority of the measured temperatures fall within the specified requirement.</p> <p>The following states of operation shall be defined and displayed at these locations.</p> <table border="0"> <thead> <tr> <th align="center">FUNCTION</th> <th align="center">LOCATION</th> </tr> </thead> <tbody> <tr> <td align="center">1. AC Fail</td> <td align="center">Front dash</td> </tr> <tr> <td align="center">2. All other status indications</td> <td align="center">At unit status panel</td> </tr> </tbody> </table>	FUNCTION	LOCATION	1. AC Fail	Front dash	2. All other status indications	At unit status panel		
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<p>3.99 Air Flow Passenger Area.</p>	<p>AIR FLOW</p> <p>Passenger Area</p> <p>The cooling mode of the interior climate control system shall introduce air into the bus at or near the ceiling height at a minimum rate of 25 cubic feet per minute (cfm) per passenger based on the standard configuration bus carrying a number of passengers equal to 150 percent of the seated load. Airflow shall be evenly distributed throughout the bus with air</p>								

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	<p>velocity not exceeding 100 feet per minute on any passenger. The ventilating mode shall provide outside air at a minimum flow rate of 20 cfm per passenger.</p> <p>Airflow may be reduced to 15 cfm per passenger (150 percent of seated load) when operating in the heating mode. The fans shall not activate until the heating element has warmed sufficiently to assure at least 70° F air outlet temperature. The heating air outlet temperature shall not exceed 120° F under normal operating conditions.</p> <p>The air shall be composed of no less than 20 percent outside air.</p>		
<p>4.00 Bus Interior Climate Control</p>	<p>Operator's Area</p> <p>The bus interior climate control system shall deliver at least 100 cfm of air to the operator's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shutdown of the airflow. Airflow in the heating mode shall be reduced proportionally to the reduction of airflow into the passenger area. The windshield defroster unit shall meet the requirements of SAE Recommended Practice J382, Windshield Defrosting Systems Performance Requirements, and shall have the capability of diverting heated air to the operator's feet and legs. The defroster or interior climate control system shall maintain visibility through the operator's side window.</p>		
<p>4.01 Air Filtration</p>	<p>AIR FILTRATION</p> <p>Air shall be filtered before discharge into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.1 requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 gram per 1,000 cfm cell. More efficient air filtration may be provided to maintain efficient heater and/or evaporator operation. Air filters shall be easily removable for service. Air filters shall be cleanable.</p>		
<p>4.02 Roof Ventilators</p>	<p>ROOF VENTILATORS</p> <p>Two roof ventilators shall be provided in the roof of the 35 and 40-foot buses, one approximately over or just forward of the front axle and the other approximately over the rear axle. One ventilator shall be provided in the roof of 30-foot buses, approximately over the rear axle. The rear roof ventilator/escape hatch requirement may be deleted if the installation of said component precludes the mounting of roof mounted equipment required by this specification.</p> <p>Each ventilator shall be easily opened and closed manually by a 50th percentile female. If roof ventilator(s) cannot be reached by a 50th percentile female, then a tool shall be provided to allow this. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. Ventilator shall cover an opening area no less than 425 square inches and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than 4 inches, or with all four edges raised simultaneously to a height of no less than 3½ inches. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator(s) shall be sealed to prevent entry of water when closed.</p>		

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<p>4.03 HVAC Diagnostic and Function Control</p>	<p>MAINTAINABILITY</p> <p>All HVAC units shall incorporate a diagnostic and function control panel. For maintenance purposes, the panel shall permit full manual operation of the HVAC unit. The first power up cycle shall reset all automatic operation. The panel shall incorporate/gateway all diagnostic routines and test functions required to attain proper system operation during shop level repairs. No PC based external software shall be required to attain shop level maintenance. No reconfiguration of certain system settings or historical data shall be attainable or erasable at the diagnostic and function panel. All indication lamps and/or displays shall be solid state (LED).</p> <p>Manually controlled shutoff valves in the refrigerant lines shall allow isolation of the compressor and dehydrator filter for service. To the extent practicable, self-sealing couplings utilizing O-ring seals shall be used to break and seal the refrigerant lines during removal of major components, such as the refrigerant compressor. Shut-off valves may be provided in lieu of self-sealing couplings. The condenser shall be located to efficiently transfer heat to the atmosphere, and shall not ingest air warmed above the ambient temperature by the bus mechanical equipment, or to discharge air into any other system of the bus. The location of the condenser shall preclude its obstruction by wheel splash, road dirt or debris. HVAC components located within 6 inches of floor level shall be constructed to resist damage and corrosion.</p> <p>entrance/exit area heating</p> <p>Heat shall be supplied to the entrance and exit areas to prevent accumulation of snow, ice, or slush with bus operating under design operating profile and corresponding door opening cycle.</p>		
<p>4.04 Exterior Route Displays</p>	<p>EXTERIOR ROUTE DISPLAYS</p> <p>Destination Signs</p> <p>An automatic electronic destination sign system shall be furnished on the front, on the right side near the front door, and on the rear of the vehicle. Display areas of destination signs shall be clearly visible in direct sunlight and/or at night. The sign system shall provide optimum visibility of the message display units for passengers and shall meet applicable ADA requirements defined in 49 CFR, Part 38.39. Destination signs shall be installed in such a manner as to facilitate easy access for replacement of the entire sign assembly, or components such as LED's and electronic control modules, from inside the bus within 60 minutes by a 3M mechanic. Associated parts shall be commercially available.</p> <p>Destination messages, route designations, and public relations messages shall be independently selectable via a single Operator's Control Panel (OCP) which shall include a display monitor. The rear route number sign shall be controlled by the same OCP that operates the destination signs. The OCP display monitor readout shall show the exact information displayed on the destination signs and route number sign. The OCP shall be conveniently located for the bus operator and mounted in such a manner that will not pose any safety hazard. The OCP shall utilize a durable weatherproof keypad with tactile feel for</p>		

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	<p>destination message control functions.</p> <p>The destination sign system shall be capable of programming 10,000 message lines. The number of public relations messages shall be limited only by the remaining number of message lines not used for destination purposes. Sign displays shall have alternating message capability with programmable blanking time between message lines as may be required. Variable blanking times shall be programmable between 0.5 to 25 seconds in duration. Each line message or blanking time for each message shall be individually programmable. The message display units shall incorporate an automatic blanking feature that will cause the display area to blank within 30 seconds of the bus master power switch being turned off.</p> <p>Destination Sign Programming: The electronic sign system shall be programmable via an integral connector located in the front destination sign area. Software shall be furnished for programming the sign system via an IBM-compatible, laptop computer. Software shall be capable of providing a high degree of flexibility to create or select preprogrammed fonts and graphic displays. The sign shall have the capability of being programmed in the field using a PC or field programmer. Message program information shall be transferable to and/or from the field programmer device as specified by the Procuring Agency in attachments to Part 5: Technical Specifications.</p> <p>All sign displays shall be comprised of pixels that consist of 100% Light Emitting Diodes for illumination at all times. The LED's shall be rated for 100,000 hour life. There shall be no ballasts, bulbs or flip-dots. Under conditions of direct sunlight, the LED's shall automatically intensify to improve visibility.</p> <p>The front destination sign shall have no less than 1,792 LED dot pixels, 16 rows by 112 columns, with a message display area of not less than 8 inches high by not less than 56 inches wide.</p> <p>The side destination sign shall have no less than 560 LED dot pixels, having at least 7 rows and 80 columns with a message display area of not less than 2.7 inches high by not less than 36 inches wide.</p> <p>The rear route number sign display area shall have no less than 161 LED dot pixels, having at least 7 rows and 23 columns with a message display area of not less than 6.1 inches high by not less than 13.8 inches wide. The sign shall be capable of displaying 4 alphanumeric characters (1 through 9 and A through Z). The rear route number sign shall be located on the rear of the bus in a location to be specified by the Procuring Agency.</p> <p>The bus "Master Run" switch shall control power to the sign system. The sign system shall be operable in all switch positions except "Off".</p> <p>The destination sign compartments shall be designed to prevent condensation and entry of moisture and dirt. Additional provisions shall be included, if necessary, to prevent fogging of both destination sign compartment window and glazing on unit itself. Access shall be provided to allow cleaning of inside of destination sign compartment window and unit glazing.</p> <p>A complete listing of destination sign readings for initial sign programming by the</p>		
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	<p>manufacturer will be provided with award of contract.</p>		
<p>4.05 Bus Block Numbers</p>	<p>Bus Block Numbers The front bus block number sign shall be electronic Light Emitting Diode (LED) type and shall be capable of displaying 4 alphanumeric characters (1 through 9 and A through Z) with an ADA compliant display area. The block numbers to be displayed shall be input directly into the destination sign system's OCU and shall be independent of any destination sign message code. This sign shall be mounted on the front dash panel toward the curbside and shall not obstruct driver's view.</p>		
<p>4.06 Passenger Interior Displays</p>	<p>PASSENGER INFORMATION AND ADVERTISING</p> <p>Interior Displays Provisions shall be made on the rear of the operator's barrier for a frame to retain information posted by the Procuring Agency, such as routes and schedules. Advertising media 11 inches high and 0.09 inches thick shall be retained near the juncture of the bus ceiling and sidewall. The retainers may be concave and shall support the media without adhesives. The media shall be illuminated by the interior light system.</p> <p>The Contractor shall provide at least six "schedule boxes" per bus. Schedule boxes shall be designed to accommodate schedule media. Materials, design, size and location shall be approved by Procuring Agency.</p> <p>Exterior Displays No provisions shall be made to integrate advertising into the exterior design of the bus.</p> <p>Numbering, Signing, Decals Monograms, numbers and other special signing specified by the Procuring Agency shall be applied to the inside and outside of the bus. Signs shall be durable and fade, chip, and peel resistant. They may be painted signs, decals, or pressure-sensitive appliques. At least one permanent sign shall be provided on each side of the bus interior to indicate that seats at the front are priority seats for elderly and handicapped passengers and be in compliance with ADA requirements. The exact wording; size, color and location for these signs/decals shall be approved by the Procuring Agency.</p>		
<p>4.07 Passenger Stop Request and Exit Signal</p>	<p>PASSENGER STOP REQUEST/EXIT SIGNAL A passenger "Stop Requested" signal system that complies with applicable ADA requirements defined in 49 CFR, Part 38.37 shall be provided. The system shall consist of a heavy-duty pull cable, chime, and interior sign message. The pull cable shall be located the full length of the bus on the sidewalls at the level where the transom is located. It shall be easily accessible to all passengers, seated or standing. Vertical pull cables shall be provided at each window mullion. Pull cable(s) shall activate a solid state or magnetic proximity switch(es). At each mobility aid parking position a 12" long touch-tape switch shall be mounted vertically on the bottom of the mobility aid flip seats within easy reach of mobility aid</p>		

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	<p>bound passengers. The tape switch shall have a connector and be removable without disassembly of the seat. Alternate signal switches shall be considered if equivalency can be demonstrated to the Procuring Agency's satisfaction.</p> <p>An auxiliary passenger "Stop Requested" signal shall be installed at the rear door to provide passengers standing in the rear door/exit area convenient means of activating the signal system. The signal shall be a heavy-duty push button type located on modesty panel stanchion immediately forward of and behind the rear door. Button shall be clearly identified as "Passenger Signal."</p> <p>Exit signals located in the mobility aid parking area shall be no higher than 4 feet above the floor. Instructions shall be provided to clearly indicate function and operation of these signals.</p> <p>A single "Stop Requested" chime shall sound when the system is first activated. A double chime shall sound when the system is first activated from mobility aid passenger areas.</p> <p>A "Stop Requested" message in red letters shall be illuminated when the passenger "Stop Requested" signal system is activated. The "Stop Requested" message shall remain visible until one or both passenger doors are opened. The message shall be visible to the seated operator and seated passengers. The operator shall be able to deactivate the signal system from the operator's area. A green light shall be mounted above the rear door, approximately on center of the rear door actuator compartment access panel, to indicate when the rear doors have been unlocked.</p>		
<p>4.08 Radio Communication System</p>	<p>RADIO COMMUNICATION SYSTEM</p> <p>A location convenient to the operator shall be provided for the radio control head, speaker, handset, and cradle. The location shall conform to SAE Recommended Practice J287 "Driver Hand Control Reach." Provisions for attaching an antenna to the roof and routing an antenna lead to the radio compartment shall include a 3/4-inch inside diameter conduit with a pull wire. The antenna mounting and lead termination shall be accessible from the bus interior.</p> <p>A full size electronics cabinet shall accommodate the installation of communications hardware, such as the radio and CAD/AVL equipment. Cabinet shall be heavy-duty construction (minimum 14 gauge), and corrosion-resistant, securely mounted atop the street-side front wheel housing. The cabinet shall provide approximately 54 inches of free height that accommodates four shelves of standard 19-inch electronic racks of 18-inch depth. Power provisions shall be made for the radio and electronics inside the cabinet. Circuits and wiring for each shelf shall be independent of one another at 30 amps 12VDC and 24VDC supplies and a chassis ground provided on four independent terminal strips with a minimum of six terminal mounting locations. Terminal strips shall be clearly identified. Terminal strips and associated wiring shall not interfere with shelf operation.</p> <p>The cabinet shall be provided with a terminal of the VLAN system. A 3-inch inside diameter conduit, with a pull wire, shall connect the cabinet with the main bus wiring harnesses above the streetside lighting fixtures and the destination sign compartment. A 2 1/4-inch inside diameter metallic conduit, with a pull wire, shall connect the control head and radio control unit location</p>		

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	<p>with the electronics cabinet.</p> <p>The electronics cabinet shall provide adequate ventilation for 750 watts of equipment operating within the range of -20°F +40°F.</p> <p>The cabinet door shall have a full-length stainless steel piano-type hinge. A sturdy hold-open device shall be installed on the door. The door shall have a recessed handle and a lock. The cabinet shall be splash-proof and properly ventilated with the service door closed. Cabinet shall include four modular slide-out trays, which are removable and can be repositioned to accommodate changes in equipment position as needed. Slide-out trays shall incorporate a heavy-duty slide or roller mechanism capable of supporting a minimum load of 150 lb. and, under full load, shall be able to withstand the shock and vibration of transit service, without damage to the slide or roller mechanisms. The radio compartment shall be supplied with a 30-amp, 12-volt, DC, protected service with positive and negative leads and shall be connected to the operator's area by waterproof, 2¼-inch inside diameter, metallic conduit from overhead. There shall be two power sources – one direct; one switched circuit activated by the “day run” position on the Master Switch.</p> <p>Odometer or transmission pulses shall be provided to the radio box.</p> <p>GPS and Radio Antenna reinforcing plates shall be installed in the roof sections as required by Procuring Agency. These plates shall be at least three (3) feet apart and shall be located such that:</p> <ul style="list-style-type: none"> * Cable distance to radio box is less than 25 feet. * The underside of the reinforcement plate area is accessible for service of the antenna connector. The bus manufacturer shall install an interior ceiling cover plate, if needed, such as Viking Marine P/N 1057. * The location of the reinforcement plate for the antennas shall not be more than 10° from horizontal. <p>The GPS antenna/receiver shall be located at least one (1) meter from other radiating elements.</p> <p>Cable conduits shall be routed for ease in cable replacement. Conduits shall have at least ¾-inch inside diameter and shall be routed in a continuous fashion. The conduit shall have bend radiuses that will permit the ease of pulling cables (no sharp or right angles).</p>		
<p>4.09 Vehicle Local Area Network</p>	<p>Vehicle Local Area Network The Contractor shall install and verify the operability of a Vehicle Local Area Network (VLAN) in accordance with SAE Recommended Practice J1939, Serial Data Communications Between Microcomputer Systems in Heavy-Duty Applications and SAE Recommended Practice J2496, Transport Area Network Cabling. The VLAN shall initiate from the Electronics Cabinet and have Device Access Boxes in strategic locations throughout the bus including the engine</p>		

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	<p>compartment, front electrical junction box, front dash area, front destination sign compartment and over both passenger doors.</p> <p>The VLAN shall provide the inter connectivity of all equipment on the bus with microprocessor controls. Functionally, the VLAN shall support an environment where all components, modules, and systems installed on the bus shall have built-in diagnostics capability. The diagnostic system shall be capable of checking the communications between all components of the installed systems.</p>		
<p>4.10 Public Address System</p>	<p>PUBLIC ADDRESS SYSTEM</p> <p>A public address system shall be provided that complies with the ADA requirements of 49 CFR, Part 38.35 and enables the operator to address passengers either inside or outside the bus. Inside speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. A weatherized speaker shall be provided so that announcements can be clearly heard by passengers standing outside the bus near the front door. The speaker system shall measure the local ambient noise level and compensate gain accordingly. An operator-controlled switch shall select inside or outside announcements. A separate volume control shall be provided for the outside system if volume adjustment would otherwise be necessary when switching from inside to outside. The system shall be muted when not in use. The microphone shall be vandal resistant, mounted on a heavy-duty, flexible gooseneck, which is secured with tamper-proof fasteners and will allow the operator to comfortably speak into it without using his hands. A provision shall be provided to secure the microphone in a stored position when not in use. An input jack shall be provided in the operator's area for a hand held microphone.</p>		
<p>4.11 Electrical System</p> <p>General Requirements</p>	<p>The bus shall be equipped with a programmable logic control system that is computer based and completely modular. The programmable logic control collects information received from input devices throughout the bus and then communicates with its system components or other output devices in remote areas of the bus through multiplex wiring system. The entire system will reduce the amount of wiring over a conventional wiring/harness electrical system. Versatility and future expansion shall be provided for by expandable system architecture. The system components shall be capable of operating in an environment of between -20 degrees F to 170 degrees F while encountering mobile shock and vibrations. The system shall store and retrieve data for the mechanical and electrical functions of the bus. All components in the system will be interchangeable. The multiplex power source shall be isolated to avoid any ground noise.</p> <p>The electrical system shall provide and distribute power to ensure satisfactory performance of all electrical components. The electrical system shall supply power at two primary voltages, 24 volts and 12 volts direct current, nominal, and employ alternating current up to 220 volts that does not present an electrical shock hazard. Electrical power provided for the fare collection device and the radio compartment shall be 12 volts DC as specified in attachments to Part 5: Technical Specifications. Precautions shall be taken to minimize hazards to service personnel. Transient voltages above 220 volts may be used in the lighting system. The power generating system shall be rated sufficiently higher than the total possible electrical load to maintain the charge on the batteries at all operating conditions including the</p>		

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	<p>engine at idle. Circuit breakers or fuses, except for those involved in propulsion system start-up, shall protect all circuits. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable, and they shall be easily accessible for replacement.</p> <p>Redundant grounds shall be used for all electrical equipment, except where it can be demonstrated that redundant grounds are not feasible or practicable. One ground may be the bus body and framing. Grounds shall not be carried through hinges, bolted joints (except those specifically designed as electrical connectors), or power plant mountings. Electrical equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system. To the extent practicable, wiring shall not be located under the bus floor. Wiring and electrical equipment necessarily located under the bus shall be insulated from water, heat, corrosion, and mechanical damage.</p>		
<p>4.12 Modular System</p>	<p>Design of the electrical system shall be modular so that each major component, apparatus panel, or wiring bundle is easily separable with standard hand tools or by means of connectors. Each module, except the main body wiring harness, shall be removable and replaceable in less than 1 hour by a 3M mechanic. Power plant wiring shall be an independent wiring module. The power plant wiring shall allow for the complete removal of the power plant by means of environmentally sealed modular disconnects. No point to point disconnect of power plant wiring or wiring pullback shall be permitted Replacement of the engine compartment wiring module(s) shall not require pulling wires through any bulkhead or removing any terminals from the wires.</p>		
<p>4.13 Wiring Terminals</p>	<p>All wiring between electrical components and terminations, except battery wiring, shall have double electrical insulation, shall be waterproof, and shall conform to specification requirements of SAE Recommended Practice J1127 and J1128. Except as interrupted by the master battery disconnect switch, battery and starter wiring shall be continuous cables, grouped, numbered, and/or color-coded with connections secured by bolted terminals; and shall conform to specification requirements of SAE Standard J1127-Type SGT or SGX and SAE Recommended Practice J541. Wiring harnesses shall not contain wires of different voltages unless all wires within the harness are sized to carry the current and insulated for the highest voltage wire in the harness.</p> <p>Double insulation shall be maintained as close to the terminals as possible. The requirement for double insulation shall be met by sheathing all wires and harnesses with non-conductive, rigid or flexible conduit. Strain-relief fittings shall be provided at points where wiring enters all electrical components. Grommets of elastomeric material shall be provided at points where wiring penetrates metal structures outside of electrical enclosures. Wiring supports shall be protective and non-conductive at areas of wire contact and shall not be damaged by heat, water, solvents, or chafing.</p> <p>All wiring harnesses over 5 feet long and containing at least 5 wires shall include 10 percent excess wires for spares that are the same size as the largest wire in the harness excluding the battery cables. This requirement for spare wires does not apply to data links and/or communication cables. Wiring length shall allow end terminals to be replaced twice without pulling, stretching, or replacing the wire. Except for large wires such as battery cables, terminals shall be crimped to the wiring and may be soldered only if the wire is not stiffened above the</p>		

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	<p>terminal and no flux residue remains on the terminal. Terminals shall be corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. T splices may be used when there is less than 25,000 circular mills of copper in the cross section and a mechanical clamp is used in addition to solder on the splice; the wire supports no mechanical load in the area of the splice; and the wire is supported to prevent flexing.</p> <p>All cable connectors shall be locking type, keyed, and watertight, unless enclosed in watertight cabinets. Pins shall be removable, crimp contact type of the correct size and rating for the wire being terminated. Unused pin positions shall be sealed with sealing plugs. Adjacent connectors shall either use different inserts or different insert orientations to prevent incorrect connections.</p>		
<p>4.14 Junction Box</p>	<p>All relays, controllers, flashers, circuit breakers, and other electrical components shall be grouped according to voltage and mounted in easily accessible junction boxes. The boxes shall be sealed to prevent moisture from normal sources, including engine compartment cleaning, from reaching the electrical components and shall prevent fire that may occur inside the box from propagating outside the box. The components and circuits in each box shall be identified and their location permanently recorded on a schematic drawing glued to or printed on the inside of the box cover or door. The drawing shall be protected from oil, grease, fuel, and abrasion. The front junction box shall be completely serviceable from the driver's seat, vestibule, or from outside. A rear start and run control box shall be mounted in an accessible location in the engine compartment.</p>		
<p>4.15 Electrical Components</p>	<p>All electrical components, including switches, relays, flashers, and circuit breakers, shall be heavy-duty designs. These components shall be longest lasting, commercially available, and shall be replaceable in less than 5 minutes by a 3M mechanic. Sockets of plug-in components shall be polarized where required for proper function and the components shall be positively retained. Any manually resettable circuit breakers critical to the operation of the bus shall be mounted in a location convenient to the driver and provide visible indication of open circuits. All electric motors, except cranking motors, shall be heavy-duty brushless type, with a constant duty rating of no less than 40,000 hours. Electric motors shall be located for easy replacement and except for the cranking motor shall be replaceable in less than 15 minutes by a 3M mechanic. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for more than 30 seconds at a time to prevent overheating.</p>		
<p>4.16 Multiplex Wiring System</p>	<p>The components of the multiplex system shall be of modular design, thereby providing for ease of replacement by maintenance personnel. The modules shall be easily accessible for troubleshooting electrical failures and performing system maintenance. Each module shall be shielded to prevent interference by EMI and RFI; and shall utilize LEDs to indicate circuit integrity and assist in rapid circuit diagnostics and verification of the load and wiring integrity. In conjunction with relays if necessary, each circuit shall be capable of providing a current load of up to 10 Amperes. The internal controls shall be a solid state device, providing an extended service life. Wiring for data bus and node module power shall consist of three, 22 gauge or larger, UL approved, shielded, twisted pairs.</p> <p>Ten percent spare input and output shall be provided at each I/O location. Wiring used for the multiplexing shall be stamped with the address of the corresponding I/O location.</p> <p>Protection to each individual circuit shall be provided. An automatic test system, integral to the</p>		

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	<p>multiplexing, shall be provided. The system shall be hosted on an IBM-compatible personal computer.</p>		
4.17 Batteries	<p>Batteries shall be easily accessible for inspection and service only from the outside of the bus. The batteries shall be securely mounted on a stainless steel tray that can accommodate the size and weight of the batteries. The battery tray shall pull out easily and properly support the batteries when they are being serviced. The tray shall allow each battery cell to be serviced and filled with either manual or automatic equipment. A positive lock shall retain the battery tray in the stowed position.</p> <p>Four Group 31 MHD battery units conforming to SAE Standard J537 shall be provided. Each battery shall be fitted with threaded stud terminals and have a minimum of 950 cold cranking amps. Each battery shall have a purchase date no more than 60 days from date of release for shipment to the Procuring Agency.</p> <p>Positive and negative terminal ends shall have different size studs to prevent incorrect installation. The battery terminal ends and cables shall be color-coded with red for the primary positive, black for negative, and another color for any intermediate voltage cables. Battery terminals shall be located for access in less than 30 seconds with jumper cables. Battery cables shall be flexible and sufficiently long to reach the batteries with tray in the extended position without stretching or pulling on any connection and shall not lie directly on top of the batteries. Battery cables must be of sufficient size to carry the load required by the starting motor.</p> <p>Jump-start connector shall be provided in the engine compartment equipped with dust cap and adequately protected from moisture, dirt and debris.</p>		
4.18 Master Battery Switch	<p>A master switch on the battery positive (+) shall be provided in the battery compartment near the batteries for complete disconnecting from all bus electrical systems except for safety devices such as fire suppression system and other systems as specified. The location of the master battery switch shall be clearly identified on the access panel and be accessible in less than 10 seconds for activation. The master switch shall be capable of carrying and interrupting the total circuit load. Opening the master switch with the power plant operating shall not damage any component of the electrical system. The location of the master battery switch shall prevent corrosion from fumes and battery acid when the batteries are washed off.</p>		
4.19 Radio Noise Attenuation	<p>Proper suppression equipment shall be provided in the electrical system to eliminate interference with radio and television transmission and reception. This equipment shall not cause interference with any electronic system on the bus.</p>		

End of Specifications

ATTACHMENT D
BIDDER DATA SHEET

1. **QUALIFICATION OF BIDDER:** The Bidder shall have the capability and capacity in all respects to fully satisfy all of the contractual requirements, to include financial stability, no criminal history or proceedings, etc. Bidder's signature on this solicitation certifies that his firm is properly licensed for providing the goods/services specified. The Bidder shall be legally authorized to do business in the Commonwealth of Virginia.

2. **YEARS OF BUSINESS:** Indicate the length of time you have been in business providing this type of service _____ years _____ months.

3. State below the number of qualified employees in your employment with experience in the type of work described in this solicitation. _____ Describe your plans to increase your personnel resources if necessary to perform this contract, and state other similar contracts you are currently working?

4. **REFERENCES:** Indicate below a listing of at least four (3) recent references for whom you have provided this type of service. Include the date service was furnished and the name and address of the person the Commonwealth has your permission to contact. A narrative statement should be provided for each reference describing the scope of work, size and type of service provided to each reference. Additional sheets may be used if necessary.
 - A. Company: _____ Contact: _____
Phone: (____) _____ Fax: (____) _____
Email Address _____
Project: _____
Dates of Service: _____ \$ Value: _____

 - B. Company: _____ Contact: _____
Phone: (____) _____ Fax: (____) _____
Email Address _____
Project: _____
Dates of Service: _____ \$ Value: _____

 - C. Company: _____ Contact: _____
Phone: (____) _____ Fax: (____) _____
Email Address _____
Project: _____
Dates of Service: _____ \$ Value: _____

5. Are you a subsidiary firm: ___YES ___NO. If yes, list the name and location of your parent affiliation:

6. Name and title of firm's official to whom further communication should be directed: _____

STATUS: Contractor ____ IS ____ IS NOT certified as a minority business by the Virginia Department of Minority Business Enterprise.
Certificate No. is _____.

Contractor ____ IS ____ IS NOT certified a women-owned business by the Virginia Department of Minority Business Enterprises.
Certificate No. is _____.

Contractor ____ IS ____ IS NOT certified a small business by the Virginia Department of Minority Business Enterprises.
Certificate No. is _____.

7. Any goods or services offered by your firm that are not specifically mentioned in the Statement of Needs. _____

I certify the accuracy of this information.

Signed: _____

Title: _____

ATTACHMENT E

FEDERAL CONDITIONS OF MANUFACTURE/VENDOR

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1. BUY AMERICA REQUIREMENTS**49 U.S.C. 5323(j)****49 CFR Part 661**

The Buy America regulation, at 49 CFR 661.13, requires notification of the Buy America requirements in FTA-funded contracts, but does not specify the language to be used. The following language has been developed by FTA.

Buy America - The contractor agrees to comply with 49 U.S.C. 5323(j) and 49 C.F.R. Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 C.F.R. 661.7, and include final assembly in the United States for 15 passenger vans and 15 passenger wagons produced by Chrysler Corporation, and microcomputer equipment and software. Separate requirements for rolling stock are set out at 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. 661.11. Rolling stock must be assembled in the United States and have a 60 percent domestic content.

A bidder or offeror must submit to the FTA recipient the appropriate Buy America certification (below) with all bids or offers on FTA-funded contracts, except those subject to a general waiver. Bids or offers that are not accompanied by a completed Buy America certification must be rejected as nonresponsive. This requirement does not apply to lower tier subcontractors.

Certification requirement for procurement of steel, iron, or manufactured products.*Certificate of Compliance with 49 U.S.C. 5323(j)(1)*

The bidder or offeror hereby certifies that it will meet the requirements of 49 U.S.C. 5323(j)(1) and the applicable regulations in 49 C.F.R. Part 661.5.

Date _____

Signature _____

Company Name _____

Title _____

Certificate of Non-Compliance with 49 U.S.C. 5323(j)(1)

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(1) and 49 C.F.R. 661.5, but it may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(A), 5323(j)(2)(B), or 5323(j)(2)(D), and 49 C.F.R. 661.7.

Date _____

Signature _____

Company Name _____

Title _____

Certification requirement for procurement of buses, other rolling stock and associated equipment.

Certificate of Compliance with 49 U.S.C. 5323(j)(2)(C).

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j)(2)(C) and the regulations at 49 C.F.R. Part 661.11.

Date _____

Signature _____

Company Name _____

Title _____

Certificate of Non-Compliance with 49 U.S.C. 5323(j)(2)(C)

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(2)(C) and 49 C.F.R. 661.11, but may qualify for an exception pursuant to 49 U.S.C. 5323(j)(2)(A), 5323(j)(2)(B), or 5323(j)(2)(D), and 49 CFR 661.7.

Date _____

Signature _____

Company Name _____

Title _____

2. CARGO PREFERENCE REQUIREMENTS

46 U.S.C. 1241

46 CFR Part 381

Cargo Preference - Use of United States-Flag Vessels - The contractor agrees: a. to use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to the underlying contract to the extent such vessels are available at fair and reasonable rates for United States-Flag commercial vessels; b. to furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of leading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA recipient (through the contractor in the case of a subcontractor's bill-of-lading.) c. to include these requirements in all subcontracts issued pursuant to this contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

3. ENERGY CONSERVATION REQUIREMENTS

42 U.S.C. 6321 et seq.

49 CFR Part 18

Energy Conservation - The contractor agrees to comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act.

4. CLEAN WATER REQUIREMENTS

33 U.S.C. 1251

Clean Water - (1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq. The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

(2) The Contractor also agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FTA.

5. BUS TESTING**49 U.S.C. 5323(c)****49 CFR Part 665**

Bus Testing - The Contractor (Manufacturer] _____ agrees to comply with 49 U.S.C. A 5323(c) and FTA's implementing regulation at 49 CFR Part 665 and shall perform the following:

- 1) A manufacturer of a new bus model or a bus produced with a major change in components or configuration shall provide a copy of the final test report to the recipient at a point in the procurement process specified by the recipient which will be prior to the recipient's final acceptance of the first vehicle.
- 2) A manufacturer who releases a report under paragraph 1 above shall provide notice to the operator of the testing facility that the report is available to the public.
- 3) If the manufacturer represents that the vehicle was previously tested, the vehicle being sold should have the identical configuration and major components as the vehicle in the test report, which must be provided to the recipient prior to recipient's final acceptance of the first vehicle. If the configuration or components are not identical, the manufacturer shall provide a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing.
- 4) If the manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), the manufacturer shall provide the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

CERTIFICATION OF COMPLIANCE WITH FTA'S BUS TESTING REQUIREMENTS

The undersigned [Contractor/Manufacturer] certifies that the vehicle offered in this procurement complies with 49 U.S.C. A 5323(c) and FTA's implementing regulation at 49 CFR Part 665.

The undersigned understands that misrepresenting the testing status of a vehicle acquired with Federal financial assistance may subject the undersigned to civil penalties as outlined in the Department of Transportation's regulation on Program Fraud Civil Remedies, 49 CFR Part 31. In addition, the undersigned understands that FTA may suspend or debar a manufacturer under the procedures in 49 CFR Part 29.

Date: _____

Signature: _____

Company Name: _____

Title: _____

6. PRE-AWARD AND POST DELIVERY AUDITS REQUIREMENTS**49 U.S.C. 5323****49 CFR Part 663**

- Buy America certification is mandated under FTA regulation, "Pre-Award and Post-Delivery Audits of Rolling Stock Purchases," 49 C.F.R. 663.13.

-- Specific language for the Buy America certification is mandated by FTA regulation,

"Buy America Requirements--Surface Transportation Assistance Act of 1982, as amended,"

49 C.F.R. 661.12, but has been modified to include FTA's Buy America requirements codified at 49 U.S.C. A 5323(j).

Pre-Award and Post-Delivery Audit Requirements - The Contractor agrees to comply with 49 U.S.C. § 5323(l) and FTA's implementing regulation at 49 C.F.R. Part 663 and to submit the following certifications:

(1) Buy America Requirements: The Contractor shall complete and submit a declaration certifying either compliance or noncompliance with Buy America. If the Bidder/Offeror certifies compliance with Buy America, it shall submit documentation which lists 1) component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and 2) the location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.

(2) Solicitation Specification Requirements: The Contractor shall submit evidence that it will be capable of meeting the bid specifications.

(3) Federal Motor Vehicle Safety Standards (FMVSS): The Contractor shall submit 1) manufacturer's FMVSS self-certification sticker information that the vehicle complies with relevant FMVSS or 2) manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

**BUY AMERICA CERTIFICATE OF COMPLIANCE WITH FTA REQUIREMENTS
FOR BUSES, OTHER ROLLING STOCK, OR ASSOCIATED EQUIPMENT**

(To be submitted with a bid or offer exceeding the small purchase threshold for Federal assistance programs, currently set at \$100,000.)

Certificate of Compliance

The bidder hereby certifies that it will comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C), Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, and the regulations of 49 C.F.R. 661.11:

Date: _____

Signature: _____

Company Name: _____

Title: _____

Certificate of Non-Compliance

The bidder hereby certifies that it cannot comply with the requirements of 49 U.S.C. Section 5323(j)(2)(C) and Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, but may qualify for an exception to the requirements consistent with 49 U.S.C. Sections 5323(j)(2)(B) or (j)(2)(D), Sections 165(b)(2) or (b)(4) of the Surface Transportation Assistance Act, as amended, and regulations in 49 C.F.R. 661.7.

Date: _____

Signature: _____

Company Name: _____

Title: _____

7. LOBBYING
31 U.S.C. 1352
49 CFR Part 19
49 CFR Part 20

- Lobbying Certification and Disclosure of Lobbying Activities for third party contractors are mandated by 31 U.S.C. 1352(b)(5), as amended by Section 10 of the Lobbying Disclosure Act of 1995, and DOT implementing regulation, "New Restrictions on Lobbying," at 49 CFR § 20.110(d)

- Language in Lobbying Certification is mandated by 49 CFR Part 19, Appendix A, Section 7, which provides that contractors file the certification required by 49 CFR Part 20, Appendix A.

Modifications have been made to the Lobbying Certification pursuant to Section 10 of the Lobbying Disclosure Act of 1995.

- Use of "Disclosure of Lobbying Activities," Standard Form-LLL set forth in Appendix B of 49 CFR Part 20, as amended by "Government wide Guidance For New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96) is mandated by 49 CFR Part 20, Appendix A.

Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 [to be codified at 2 U.S.C. § 1601, et seq.] - Contractors who apply or bid for an award of \$100,000 or more shall file the certification required by 49 CFR part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the recipient.

APPENDIX A, 49 CFR PART 20--CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

(To be submitted with each bid or offer exceeding \$100,000)

The undersigned [Contractor] certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of

an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form--LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions [as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96). Note: Language in paragraph (2) herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (P.L. 104-65, to be codified at 2 U.S.C. 1601, *et seq.*)]

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, U.S.C. § 1352 (as amended by the Lobbying Disclosure Act of 1995). Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

[Note: Pursuant to 31 U.S.C. § 1352(c)(1)-(2)(A), any person who makes a prohibited expenditure or fails to file or amend a required certification or disclosure form shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such expenditure or failure.]

The Contractor, _____, certifies or affirms the truthfulness and accuracy of each statement of its certification and disclosure, if any. In addition, the Contractor understands and agrees that the provisions of 31 U.S.C. A 3801, *et seq.*, apply to this certification and disclosure, if any.

_____ Signature of Contractor's Authorized Official

_____ Name and Title of Contractor's Authorized Official

_____ Date

8. FEDERAL CHANGES
49 CFR Part 18

Federal Changes - Contractor shall at all times comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between Purchaser and FTA, as they may be amended or promulgated from time to time during the term of this contract. Contractor's failure to so comply shall constitute a material breach of this contract.

9. CLEAN AIR
42 U.S.C. 7401 et seq
40 CFR 15.61
49 CFR Part 18

Clean Air - (1) The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 *et seq.* The Contractor agrees to report each violation to the Purchaser and understands and agrees that the Purchaser will, in turn, report each violation as required to assure notification to FTA and the appropriate EPA Regional Office.

(2) The Contractor also agrees to include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with Federal assistance provided by FTA.

10. RECYCLED PRODUCTS
42 U.S.C. 6962
40 CFR Part 247
Executive Order 12873

Recovered Materials - The contractor agrees to comply with all the requirements of Section 6002 of the Resource Conservation and Recovery Act (RCRA), as amended (42 U.S.C. 6962), including but not limited to the regulatory provisions of 40 CFR Part 247, and Executive Order 12873, as they apply to the procurement of the items designated in Subpart B of 40 CFR Part 247.

11. NO GOVERNMENT OBLIGATION TO THIRD PARTIES

(1) The Purchaser and Contractor acknowledge and agree that, notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award of the underlying contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this contract and shall not be subject to any obligations or liabilities to the Purchaser, Contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

(2) The Contractor agrees to include the above clause in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the subcontractor who will be subject to its provisions.

12. PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS AND RELATED ACTS

**31 U.S.C. 3801 et seq.
49 CFR Part 31 18 U.S.C. 1001
49 U.S.C. 5307**

Program Fraud and False or Fraudulent Statements or Related Acts.

(1) The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 *et seq.* and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, apply to its actions pertaining to this Project. Upon execution of the underlying contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining to the underlying contract or the FTA assisted project for which this contract work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the Federal Government deems appropriate.

(2) The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government under a contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on the Contractor, to the extent the Federal Government deems appropriate.

(3) The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with Federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

13. TERMINATION
49 U.S.C. Part 18
FTA Circular 4220.1E

a. Termination for Convenience (General Provision) The (Recipient) may terminate this contract, in whole or in part, at any time by written notice to the Contractor when it is in the Government's best interest. The Contractor shall be paid its costs, including contract close-out costs, and profit on work performed up to the time of termination. The Contractor shall promptly submit its termination claim to (Recipient) to be paid the Contractor. If the Contractor has any property in its possession belonging to the (Recipient), the Contractor will account for the same, and dispose of it in the manner the (Recipient) directs.

b. Termination for Default [Breach or Cause] (General Provision) If the Contractor does not deliver supplies in accordance with the contract delivery schedule, or, if the contract is for services, the Contractor fails to perform in the manner called for in the contract, or if the Contractor fails to comply with any other provisions of the contract, the (Recipient) may terminate this contract for default. Termination shall be effected by serving a notice of termination on the contractor setting forth the manner in which the Contractor is in default. The contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner of performance set forth in the contract. If it is later determined by the (Recipient) that the Contractor had an excusable reason for not performing, such as a strike, fire, or flood, events which are not the fault of or are beyond the control of the Contractor, the (Recipient), after setting up a new delivery of performance schedule, may allow the Contractor to continue work, or treat the termination as a termination for convenience.

c. Opportunity to Cure (General Provision) The (Recipient) in its sole discretion may, in the case of a termination for breach or default, allow the Contractor [an appropriately short period of time] in which to cure the defect. In such case, the notice of termination will state the time period in which cure is permitted and other appropriate conditions

If Contractor fails to remedy to (Recipient)'s satisfaction the breach or default of any of the terms, covenants, or conditions of this Contract within [ten (10) days] after receipt by Contractor of written notice from (Recipient) setting forth the nature of said breach or default, (Recipient) shall have the right to terminate the Contract without any further obligation to Contractor. Any such termination for default shall not in any way operate to preclude (Recipient) from also pursuing all available remedies against Contractor and its sureties for said breach or default.

d. Waiver of Remedies for any Breach In the event that (Recipient) elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Contract, such

waiver by (Recipient) shall not limit (Recipient)'s remedies for any succeeding breach of that or of any other term, covenant, or condition of this Contract.

e. Termination for Convenience (Professional or Transit Service Contracts) The (Recipient), by written notice, may terminate this contract, in whole or in part, when it is in the Government's interest. If this contract is terminated, the Recipient shall be liable only for payment under the payment provisions of this contract for services rendered before the effective date of termination.

f. Termination for Default (Supplies and Service) If the Contractor fails to deliver supplies or to perform the services within the time specified in this contract or any extension or if the Contractor fails to comply with any other provisions of this contract, the (Recipient) may terminate this contract for default. The (Recipient) shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of the default. The Contractor will only be paid the contract price for supplies delivered and accepted, or services performed in accordance with the manner or performance set forth in this contract.

If, after termination for failure to fulfill contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the Recipient.

g. Termination for Default (Transportation Services) If the Contractor fails to pick up the commodities or to perform the services, including delivery services, within the time specified in this contract or any extension or if the Contractor fails to comply with any other provisions of this contract, the (Recipient) may terminate this contract for default. The (Recipient) shall terminate by delivering to the Contractor a Notice of Termination specifying the nature of default. The Contractor will only be paid the contract price for services performed in accordance with the manner of performance set forth in this contract.

If this contract is terminated while the Contractor has possession of Recipient goods, the Contractor shall, upon direction of the (Recipient), protect and preserve the goods until surrendered to the Recipient or its agent. The Contractor and (Recipient) shall agree on payment for the preservation and protection of goods. Failure to agree on an amount will be resolved under the Dispute clause.

If, after termination for failure to fulfill contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination had been issued for the convenience of the (Recipient).

h. Termination for Default (Construction) If the Contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified in this contract or any extension or fails to complete the work within this time, or if the Contractor fails to comply with any other provisions of this contract, the (Recipient) may terminate this contract for default. The (Recipient) shall terminate by delivering to the

Contractor a Notice of Termination specifying the nature of the default. In this event, the Recipient may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. The Contractor and its sureties shall be liable for any damage to the Recipient resulting from the Contractor's refusal or failure to complete the work within specified time, whether or not the Contractor's right to proceed with the work is terminated. This liability includes any increased costs incurred by the Recipient in completing the work.

The Contractor's right to proceed shall not be terminated nor did the Contractor charge with damages under this clause if-

1. the delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of the Contractor. Examples of such causes include: acts of God, acts of the Recipient, acts of another Contractor in the performance of a contract with the Recipient, epidemics, quarantine restrictions, strikes, freight embargoes; and
2. the contractor, within [10] days from the beginning of any delay, notifies the (Recipient) in writing of the causes of delay. If in the judgment of the (Recipient), the delay is excusable, the time for completing the work shall be extended. The judgment of the (Recipient) shall be final and conclusive on the parties, but subject to appeal under the Disputes clauses.

If, after termination of the Contractor's right to proceed, it is determined that the Contractor was not in default, or that the delay was excusable, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of the Recipient.

i. Termination for Convenience or Default (Architect and Engineering) The (Recipient) may terminate this contract in whole or in part, for the Recipient's convenience or because of the failure of the Contractor to fulfill the contract obligations. The (Recipient) shall terminate by delivering to the Contractor a Notice of Termination specifying the nature, extent, and effective date of the termination. Upon receipt of the notice, the Contractor shall (1) immediately discontinue all services affected (unless the notice directs otherwise), and (2) deliver to the Contracting Officer all data, drawings, specifications, reports, estimates, summaries, and other information and materials accumulated in performing this contract, whether completed or in process.

If the termination is for the convenience of the Recipient, the Contracting Officer shall make an equitable adjustment in the contract price but shall allow no anticipated profit on unperformed services.

If the termination is for failure of the Contractor to fulfill the contract obligations, the Recipient may complete the work by contract or otherwise and the Contractor shall be liable for any additional cost incurred by the Recipient.

If, after termination for failure to fulfill contract obligations, it is determined that the Contractor was not in default, the rights and obligations of the parties shall be the same as if the termination

had been issued for the convenience of the Recipient.

j. Termination for Convenience of Default (Cost-Type Contracts) The (Recipient) may terminate this contract, or any portion of it, by serving a notice or termination on the Contractor. The notice shall state whether the termination is for convenience of the (Recipient) or for the default of the Contractor. If the termination is for default, the notice shall state the manner in which the contractor has failed to perform the requirements of the contract. The Contractor shall account for any property in its possession paid for from funds received from the (Recipient), or property supplied to the Contractor by the (Recipient). If the termination is for default, the (Recipient) may fix the fee, if the contract provides for a fee, to be paid the contractor in proportion to the value, if any, of work performed up to the time of termination. The Contractor shall promptly submit its termination claim to the (Recipient) and the parties shall negotiate the termination settlement to be paid the Contractor.

If the termination is for the convenience of the (Recipient), the Contractor shall be paid its contract close-out costs, and a fee, if the contract provided for payment of a fee, in proportion to the work performed up to the time of termination.

If, after serving a notice of termination for default, the (Recipient) determines that the Contractor has an excusable reason for not performing, such as strike, fire, flood, events which are not the fault of and are beyond the control of the contractor, the (Recipient), after setting up a new work schedule, may allow the Contractor to continue work, or treat the termination as a termination for convenience.

14. GOVERNMENT-WIDE DEBARMENT AND SUSPENSION (NONPROCUREMENT)

Suspension and Debarment

This contract is a covered transaction for purposes of 49 CFR Part 29. As such, the contractor is required to verify that none of the contractor, its principals, as defined at 49 CFR 29.995, or affiliates, as defined at 49 CFR 29.905, are excluded or disqualified as defined at 49 CFR 29.940 and 29.945.

The contractor is required to comply with 49 CFR 29, Subpart C and must include the requirement to comply with 49 CFR 29, Subpart C in any lower tier covered transaction it enters into.

By signing and submitting its bid or proposal, the bidder or proposer certifies as follows:

The certification in this clause is a material representation of fact relied upon by **{insert agency name}**. If it is later determined that the bidder or proposer knowingly rendered an erroneous certification, in addition to remedies available

to **{insert agency name}**, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment. The bidder or proposer agrees to comply with the requirements of 49 CFR 29, Subpart C while this offer is valid and throughout the period of any contract that may arise from this offer. The bidder or proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

15. PRIVACY ACT **5 U.S.C. 552**

Contracts Involving Federal Privacy Act Requirements - The following requirements apply to the Contractor and its employees that administer any system of records on behalf of the Federal Government under any contract:

(1) The Contractor agrees to comply with, and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974,

5 U.S.C. § 552a. Among other things, the Contractor agrees to obtain the express consent of the Federal Government before the Contractor or its employees operate a system of records on behalf of the Federal Government. The Contractor understands that the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying contract.

(2) The Contractor also agrees to include these requirements in each subcontract to administer any system of records on behalf of the Federal Government financed in whole or in part with Federal assistance provided by FTA.

16. CIVIL RIGHTS REQUIREMENTS **29 U.S.C. § 623, 42 U.S.C. § 2000** **42 U.S.C. § 6102, 42 U.S.C. § 12112** **42 U.S.C. § 12132, 49 U.S.C. § 5332** **29 CFR Part 1630, 41 CFR Parts 60 et seq.**

Civil Rights - The following requirements apply to the underlying contract:

(1) Nondiscrimination - In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex,

age, or disability. In addition, the Contractor agrees to comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

(2) Equal Employment Opportunity - The following equal employment opportunity requirements apply to the underlying contract:

(a) Race, Color, Creed, National Origin, Sex - In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit laws at 49 U.S.C. § 5332, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. Parts 60 et seq., (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect construction activities undertaken in the course of the Project. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(b) Age - In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. § § 623 and Federal transit law at 49 U.S.C. § 5332, the Contractor agrees to refrain from discrimination against present and prospective employees for reason of age. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(c) Disabilities - In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, the Contractor agrees that it will comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(3) The Contractor also agrees to include these requirements in each subcontract financed in whole or in part with Federal assistance provided by FTA, modified only if necessary to identify the affected parties.

17. BREACHES AND DISPUTE RESOLUTION

49 CFR Part 18

FTA Circular 4220.1E

Applicability to Contracts

All contracts in excess of \$100,000 shall contain provisions or conditions which will allow for administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as may be appropriate. This may include provisions for bonding, penalties for late or inadequate performance, retained earnings, liquidated damages or other appropriate measures.

Flow Down

The Breaches and Dispute Resolutions requirements flow down to all tiers.

Model Clauses/Language

FTA does not prescribe the form or content of such provisions. What provisions are developed will depend on the circumstances and the type of contract. Recipients should consult legal counsel in developing appropriate clauses. The following clauses are examples of provisions from various FTA third party contracts.

Disputes - Disputes arising in the performance of this Contract which are not resolved by agreement of the parties shall be decided in writing by the authorized representative of (Recipient)'s [title of employee]. This decision shall be final and conclusive unless within [ten (10)] days from the date of receipt of its copy, the Contractor mails or otherwise furnishes a written appeal to the [title of employee]. In connection with any such appeal, the Contractor shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the [title of employee] shall be binding upon the Contractor and the Contractor shall abide by the decision.

Performance During Dispute - Unless otherwise directed by (Recipient), Contractor shall continue performance under this Contract while matters in dispute are being resolved.

Claims for Damages - Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the party or of any of his employees, agents or others for whose acts he is legally liable, a claim for damages therefor shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

Remedies - Unless this contract provides otherwise, all claims, counterclaims, disputes and other matters in question between the (Recipient) and the Contractor arising out of or relating to this agreement or its breach will be decided by arbitration if the parties mutually agree, or in a court of competent jurisdiction within the State in which the (Recipient) is located.

Rights and Remedies - The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by the (Recipient), (Architect) or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an

approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

18. DISADVANTAGED BUSINESS ENTERPRISE (DBE)

49 CFR Part 26

Background and Applicability

The newest version on the Department of Transportation's Disadvantaged Business Enterprise (DBE) program became effective July 16, 2003. The rule provides guidance to grantees on the use of overall and contract goals, requirement to include DBE provisions in subcontracts, evaluating DBE participation where specific contract goals have been set, reporting requirements, and replacement of DBE subcontractors. Additionally, the DBE program dictates payment terms and conditions (including limitations on retainage) applicable to all subcontractors regardless of whether they are DBE firms or not.

The DBE program applies to all DOT-assisted contracting activities. A formal clause such as that below must be included in all contracts above the micro-purchase level. The requirements of clause subsection b flow down to subcontracts. A substantial change to the payment provisions in this newest version of Part 26 concerns retainage (*see* section 26.29). Grantee choices concerning retainage should be reflected in the language choices in clause subsection d.

Disadvantaged Business Enterprises

a. This contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, *and Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs*. The national goal for participation of Disadvantaged Business Enterprises (DBE) is 10%. A separate contract goal **has not** been established for this procurement.

b. The contractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this DOT-assisted contract. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as **{insert agency name}** deems appropriate. Each subcontract the contractor signs with a subcontractor must include the assurance in this paragraph (*see* 49 CFR 26.13(b)).

1. The names and addresses of DBE firms that will participate in this contract;
2. A description of the work each DBE will perform;
3. The dollar amount of the participation of each DBE firm participating;

4. Written documentation of the bidder/offeror's commitment to use a DBE subcontractor whose participation it submits to meet the contract goal;
5. Written confirmation from the DBE that it is participating in the contract as provided in the prime contractor's commitment; and
6. If the contract goal is not met, evidence of good faith efforts to do so.

The successful bidder/offeror will be required to report its DBE participation obtained through race-neutral means throughout the period of performance.

- d. The contractor is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the contractor's receipt of payment for that work from DRPT. In addition, **[the contractor may not hold retainage from its subcontractors.] [is required to return any retainage payments to those subcontractors within 30 days after the subcontractor's work related to this contract is satisfactorily completed.] [is required to return any retainage payments to those subcontractors within 30 days after incremental acceptance of the subcontractor's work by the {insert agency name} and contractor's receipt of the partial retainage payment related to the subcontractor's work.]**
- e. The contractor must promptly notify DRPT, whenever a DBE subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE subcontractor to perform at least the same amount of work. The contractor may not terminate any DBE subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of **{insert agency name}**.

19. INCORPORATION OF FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS FTA Circular 4220.1E

Incorporation of Federal Transit Administration (FTA) Terms - The preceding provisions include, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the preceding contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1E, are hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Agreement. The Contractor shall not perform any act, fail to perform any act, or refuse to comply with any (name of grantee) requests which would cause (name of grantee) to be in violation of the FTA terms and conditions.

20. FTA Certifications
ATTACHMENT A-1

1.2.23 CERTIFICATION OF PRIMARY PARTICIPANT
REGARDING DEBARMENT, SUSPENSION, AND OTHER RESPONSIBILITY
MATTERS

The Primary Participant (applicant for an FTA grant or cooperative agreement, or potential contractor for major third party contract), _____ certifies to the best of its knowledge and belief, that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
2. Have not within a three-year period preceding this proposal been convicted of or has a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
3. Are not presently indicated for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (2) of this certification; and
4. Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause of default.

(If the primary participant (applicant for an FTA grant, or cooperative agreement, or potential third party contractor) is unable to certify any of the statements in this certification, the participant shall attach and explanation to his Certification.)

THE PRIMARY PARTICIPANT (APPLICANT FOR AN FTA GRANT OR COOPERATIVE AGREEMENT, OR POTENTIAL CONTRACTOR FOR A MAJOR

THIRD PARTY CONTRACT), _____, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C SECTIONS 3801 ET SEQ. ARE APPLICABLE THERETO.

Signature and Title of Authorized Official

1.1.23

The undersigned chief legal counsel for the _____ hereby certifies that the _____ has authority under State local law to comply with the subject assurances and that the certification above has been legally made.

Signature of Applicant's Attorney

Date

1.1.23 CERTIFICATION OF LOWER-TIER PARTICIPANTS REGARDING DEBARMENT, SUSPENSION AND OTHER INELIGIBILITY AND VOLUNTARY EXCLUSION

The Lower Tier Participant (potential sub-grantee or sub-recipient under an FTA project, potential third party contractor, or potential subcontractor under a major third party contact,

_____ certifies by submission of this proposal, that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by and Federal department or agency.

(If the Lower Tier Participant (potential sub-grantee or sub-recipient under an FTA project, potential third party contractor, or potential subcontractor under a major third party contract) is unable to certify to any of the statements in this certification, such participant shall attach an explanation to this proposal.)

THE LOWER-TIER PARTICIPANT (POTENTIAL SUB-GRANTEE OR SUB-RECIPIENT UNDER AN FTA PROJECT, POTENTIAL THIRD PARTY CONTRACTOR OR POTENTIAL SUBCONTRACTOR UNDER A MAJOR THIRD PARTY CONTRACT) _____, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF THE CONTENTS OF THE STATEMENTS SUBMITTED ON OR WITH THIS CERTIFICATION AND UNDERSTANDS THAT THE PROVISIONS OF 31 U.S.C. SECTIONS 3801 ET SEQ. ARE APPLICABLE THERETO.

(Signature and Title of Authorized Official)

The undersigned chief legal counsel for the _____
_____ hereby certifies that the
_____ has authority under State and Local
law to comply with the subject assurances and the certifications above has been legally
made.

(Signature of Applicant's Attorney)

(Date)

ATTACHMENT A-2

CONTRACTOR:

NUMBER:

EQUIPMENT:

1.2.21 TRANSIT VEHICLE MANUFACTURE'S CERTIFICATION HAS COMPLIANCE WITH SUBPART D, 49 CFR PART 23.

This procurement is subject to the provisions of Section 23.67 of 49 CFR Part 23. Accordingly, as a condition of permission to bid, the following certification must be completed and submitted with the bid. A bid, which does not include the certification, will not be considered.

TRANSIT VEHICLE MANUFACTURER CERTIFICATION

_____, a TVM, hereby certifies that it has complied with the requirements of Section 23.67 of 49 CFR Part 23 by submitting a current annual DBE goal to FTA. The goals apply to Federal Fiscal Year _____ (October 1, 19____ to September 30, 19____) and have been approved or not disapproved by FTA.

_____, hereby certifies that the manufacturer of the transit vehicle supplied _____ has complied with the above-reference requirement of Section 23.67 of 49 CFR Part 23.

Date: _____

Signature: _____

Title: _____

Firm: _____

ATTACHMENT 3

BIDDER'S CERTIFICATION OF DISADVANTAGED BUSINESS ENTERPRISE (DBE) SUBMISSION TO FTA

The

(name of Bidder) hereby certifies that it has submitted plans for the participation of Disadvantaged Business Enterprise (DBE) in conformation to the U. S. Department of Transportation's Minority business Enterprise Regulations (49 CFR, Part No. 26) and is eligible to bid on vehicle contracts awarded under assistance from the Federal Transit Administration (FTA).

Bidder's Name _____

Signature: _____
Authorized Agent

Date: _____

Printed Name & Title

Subscribed and sworn to before me this _____ day of _____, 20____.

Notary Public

My Commission expires _____, 20____.

ATTACHEMENT 4

Affidavit of Non-Collusion

I hereby swear (or affirm) under the penalty for perjury:

1. That I am the bidder (If the bidder is an individual, a partner in the bid (if the bidder is a partnership), or an officer or employee of the bidding corporation having authority to sign on its behalf (if the bidder is a corporation);
2. That the attached bid or bids has been arrived at by the bidder independently and have been submitted without collusion and without any agreement, understanding, or planned common course of action with any other vendor of materials, supplies, equipment, or service described in the invitation for bid, designed to limit independent bids or competition;
3. That the contents of the bid or bids has not been communicated by the bidder or its employees or agents to any person not an employee or agent of the bidder or its surety on any bond furnished with the bid or bids, and will not be communicated to any such person prior to the official opening of the bid or bids.
4. That I have fully informed myself regarding the accuracy of the statements made in the affidavit.

Bidder's Name: _____

Signature: _____

Date: _____

Authorized Signature

Print Name and Title

Subscribed and sworn to before me this _____ day of _____, 20_____.

Notary public

My Commission expires _____, 20_____.

Bidder's _____ E.I. _____ Number _____

(Number used on employer's Quarterly Federal Tax Return)

ATTCHMENT F
New Bus Manufacturing Inspection Guidelines

Pre-Building Phase

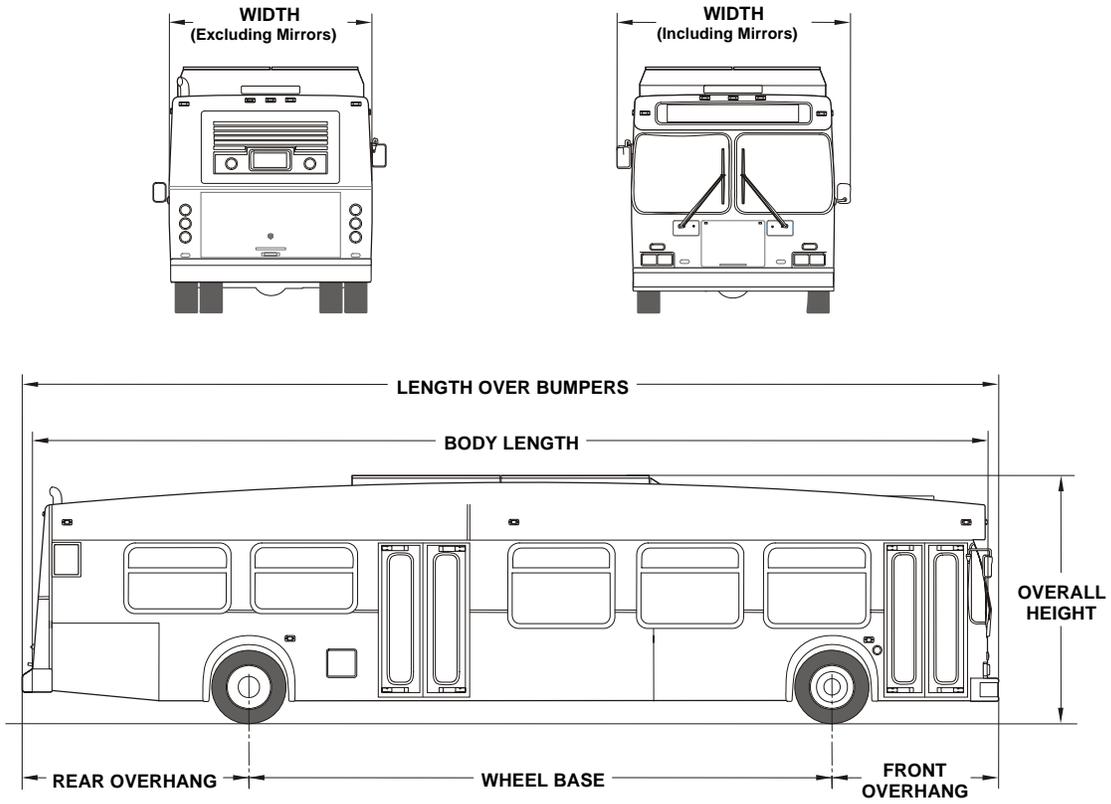
Bus Manufacturers Expectations	Transit System Expectations
1. Contract/Transit system inspectors must be given all contract documentation before beginning inspection process.	1. Manufacturers should have a formal, approved Quality Assurance (QA) Program, and must adhere to the program! Program must identify senior QA person. QA program must be an integral part of the company's ISO 9000 certification to be effective January 1, 1999. Any changes in approved program must be resubmitted to transit system for approval.
2. Bus manufacturers inspection process should be reviewed at preproduction audit meeting. Inspectors should be present and understand the difference between various manufacturers processes. At least one key customer and manufacturer representative should be present that will follow the entire procurement from start to finish.	2. Preproduction audit meeting with transit system. <ul style="list-style-type: none"> • Representatives from contracts, engineering, quality, and production should be represented
3. When change orders are required, they need to be made as early in the process as possible. Six months before building starts, whenever possible. If change orders have an impact on delivery schedule, consideration should be given to a delivery schedule revision.	<ul style="list-style-type: none"> • Manufacturers should improve communication between own departments regarding contract requirements • Must have formal sales release to review at the meeting and provide final sales release prior to production
4. Transit system inspection forms should be provided to manufacturers prior to the build so that the manufacturer will know the items the customer believes are critical. The inspection forums should be provided to the manufacturer after completion so that the defects to be corrected can be identified.	<ul style="list-style-type: none"> • Manufacturers should not use meeting to sell parts • Manufacturers should supply test information and other documents required to meet expectations.
5. If transit system requires sole source components, transit system should obtain assistance for first installation of new components.	3. Manufacturers should have application and installation approvals from suppliers whenever possible. <ul style="list-style-type: none"> • On installations of new major components, sub-supplier must be present at initial production.
6. Transit system should have a decision maker at the preproduction audit meeting.	4. Manufacturers should read and understand the <u>specification</u> prior to bid! Specification clarification should be made during the approved equals process. Ask questions at prebid meetings
7. Transit system should make every effort to inform manufacturers of what they want. Hidden agenda items buried in contract do not promote the cooperative environment desired.	5. Manufacturers service representative should be involved with preproduction audit meeting and initial production and/or at final acceptance.
8. Agree on what constitutes a line shut down before build begins.	6. Prior to build – bus manufacturer should be able to provide to the transit system a complete Bill of Material for the bus to be built.

ATTCHMENT F
New Bus Manufacturing Inspection Guidelines

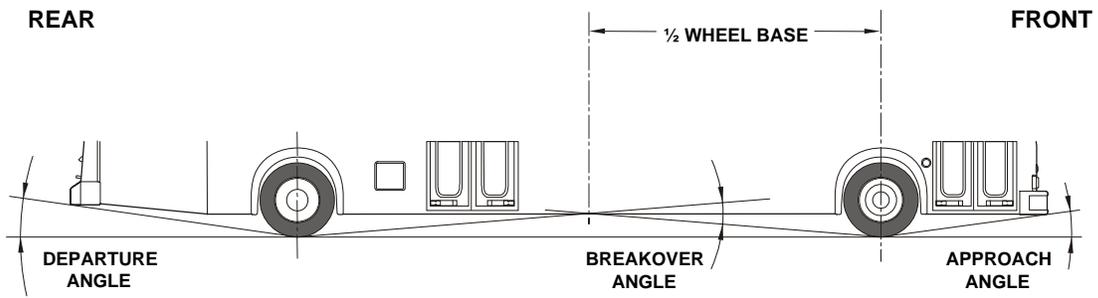
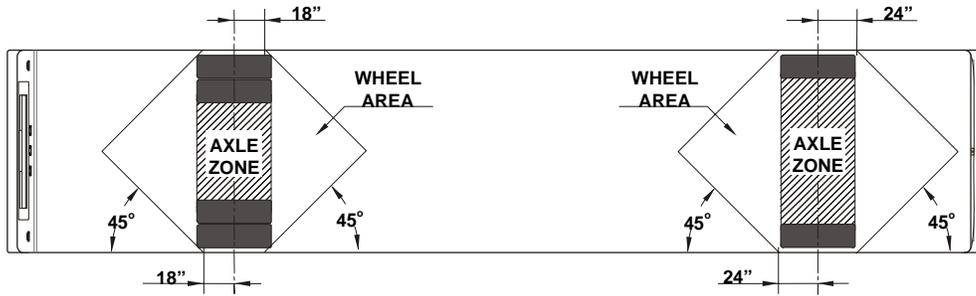
Post Building Phase

Bus Manufacturers Expectations	Transit System Expectations
<ol style="list-style-type: none">1. Increase the rate of the final acceptance process at the transit system after delivery to improve payment process.2. On property final acceptance inspection should be primarily for shipping damage and defects that occur during shipment. Complete vehicle inspection with criteria different from that used at the plant should not be done.	<ol style="list-style-type: none">1. Defects noted at property final inspection should be repaired in a timely and acceptable manner.

ATTACHMENT G
Transit Bus Dimension Lot 2 Type II

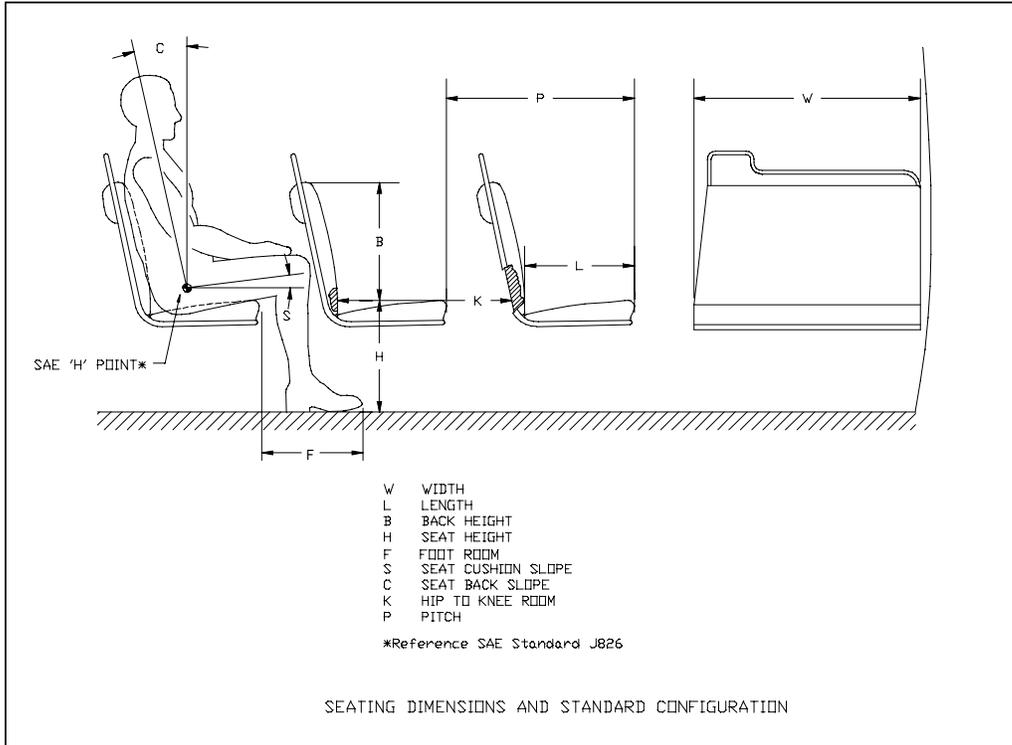


TRANSIT BUS EXTERIOR DIMENSIONS

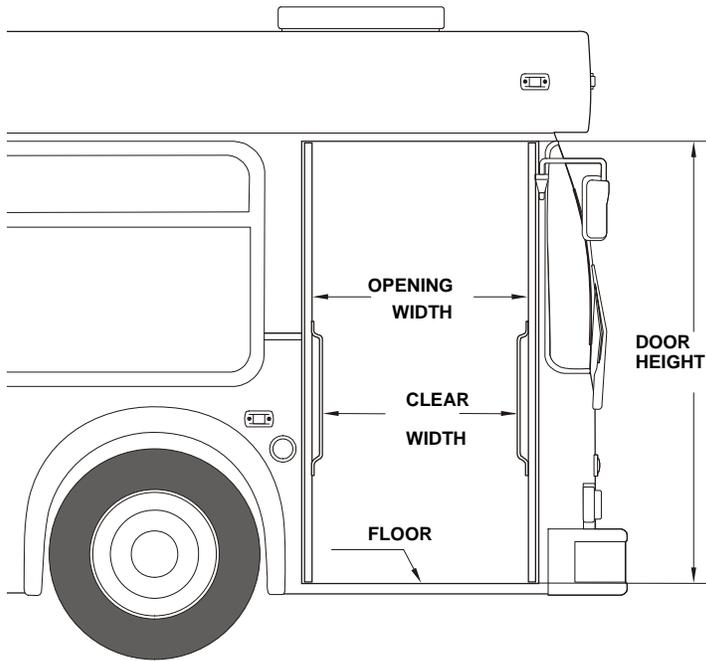


TRANSIT BUS MINIMUM ROAD CLEARANCE

ATTACHMENT H
Passenger Seating Dimensions Lot 2 Type II



ATTACHMENT I
Passenger Door Dimensions Lot 2 Type II



TRANSIT BUS MINIMUM DOOR OPENING

ATTACHMENT J VEHICLE TECHNICAL INFORMATION

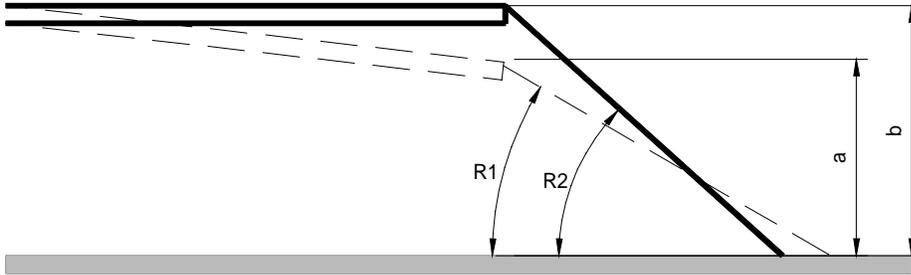
Lot 2 TYPE II

The Offeror shall submit for review by the Procuring Agency a completely filled-in Vehicle Technical Information form below to confirm his proposed vehicle and components are in compliance with the Technical Specifications.

- A. BUS MANUFACTURER _____
Bus Model _____
- B. UNDERSTRUCTURE MANUFACTURER _____
Model Number _____
- C. BASIC BODY CONSTRUCTION
1. Type _____
 2. Tubing or frame member Thickness & Dimensions
 - a. Overstructure _____
 - b. Understructure _____
 3. Skin Thickness and Material
 - a. Roof _____
 - b. Sidewall _____
 - c. Skirt Panel _____
 - d. Front End _____
 - e. Rear End _____
- D. DIMENSIONS
1. Overall Length
 - a. Over Bumpers _____ Ft. _____ In.
 - b. Over Body _____ Ft. _____ In.
 2. Overall Width
 - a. Over Body excluding Mirrors _____ In.
 - b. Over Body including Mirrors - driving position _____ In.
 - c. Over Tires Front Axles _____ In.
 - d. Over Tires Rear Axles _____ In.
 3.
 - a. Over all Height (maximum) _____ In.
 - b. Overall Height (main roof line) _____ In.
 4. Angle of Approach _____ Deg.
 5. Breakover Angle _____ Deg.
 6. Angle of Departure _____ Deg.
 7. Doorway Dimensions

	<u>Front</u>	<u>Rear</u>
A. Width Between Door Posts	_____ in	_____ in
B. Door Width Between Panels	_____ in	_____ in
C. Clear Door		_____ in
D. Doorway Height	_____ in	_____ in
E. Knuckle Clearance	_____ in	_____ in
- in
Width _____ in

8. Step Height from Ground (measured at center of doorway)



	<u>Front Doorway, Empty</u>	<u>Ramp Angle</u>	<u>Rear Doorway, Empty</u>
(Kneeled)	a. _____ inches	R1 _____ deg.	a. _____ inches
(Unkneeled)	b. _____ inches	R2 _____ deg.	b. _____ inches

9. Interior Head Room (center of aisle)

- a. Front Axle Location _____ In.
- b. Drive Axle Location _____ In.

10. Aisle Width Between Transverse Seats (minimum) _____ In.

11. Floor Height Above Ground (centerline of bus)

- a. at Front door _____ In.
- b. at Front Axle _____ In.
- c. at Drive Axle _____ In.
- d. at Rear door _____ In.

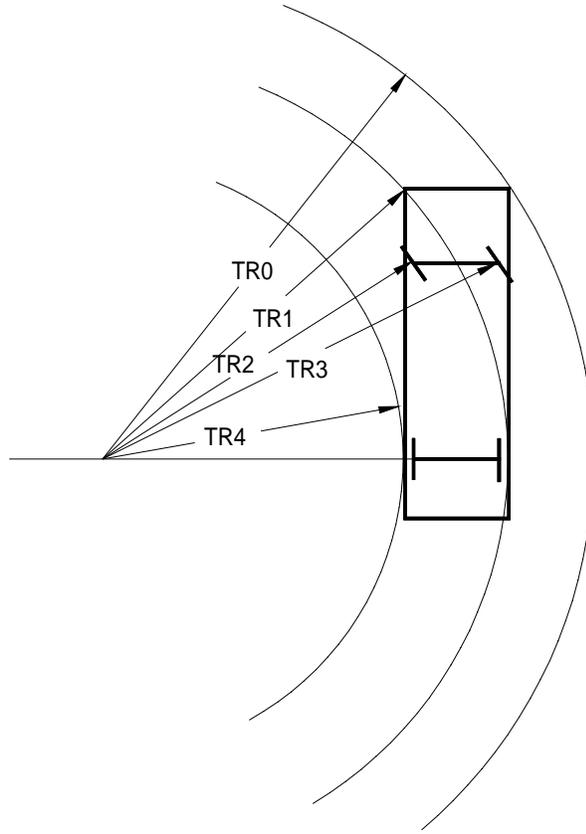
12. Minimum Ground Clearance (between bus and ground, with bus unkneeled)

- a. Excluding Axles _____ In.
- b. Including Axles _____ In.

13. Horizontal Turning Envelope (see diagram below)

- a. Outside Body Turning Radius, TR0
(including bumper) _____ Ft. _____ In.
- b. Front Inner Corner Radius, TR1 _____ Ft. _____ In.
- c. Front Wheel Inner Turning Radius, TR2 _____ Ft. _____ In.
- d. Front Wheel Outer Turning Radius, TR3 _____ Ft. _____ In.

e. Inside Body Turning Radius, TR4 _____ Ft. _____ In.
 (including bumper)



14. Wheelbase _____ In.

15. Overhang, Centerline of Axle Over Bumper
 a. Front _____ Ft. _____ In.
 b. Rear _____ Ft. _____ In.

16. Floor
 a. Interior Length _____ Ft. _____ In.
 b. Interior Width (excluding coving) _____ Ft. _____ In.
 c. Total Standee Area _____ Sq. Ft.
 d. Minimum distance between Wheelhouses:
 Front: _____ In.
 Rear: _____ In.
 e. Maximum interior floor slope
 (from horizontal) _____ Deg.

17. Passenger Capacity Provided
 a. Total Maximum Seating _____
 b. Standee Capacity _____
 c. Minimum Knee to Hip Room _____ In.
 d. Minimum Foot Room _____ In.

E. WEIGHT OF BUS

	No. of People	Front Axle			Rear Axle			TOTAL BUS
		Left	Right	Total	Left	Right	Total	
Empty Bus Full Fuel and Farebox	0							
Fully Seated Full Fuel and Farebox	_____ + Driver							
Fully Loaded Standee and Fully Seated Full Fuel and Farebox	_____ + Driver							
Crush Load (1.5xFully Loaded)	_____							
GVWR								
GAWR								

F. ENGINE, MAIN

1. Manufacturer _____
2. Type _____
3. Model Number _____
4. No. of Cylinders _____
5. Bore _____ In.
6. Stroke _____ In.
7. Displacement _____ Cu. In.
8. Compression Ratio _____
9. Injector Type and Size _____
10. Net S.A.E. Horsepower _____ HP at _____ RPM
11. Net S.A.E. Torque _____ lb. ft. at _____ RPM
12. Crankcase Oil Capacity
 - a. New Engine, dry _____ gals.
 - b. New Engine, wet _____ gals.
13. Turbocharger, Make & Model _____
14. Maximum Speed, no load _____ RPM
15. Maximum Speed, full load _____ RPM
16. Speed at Idle _____ RPM
17. Speed at Fast Idle _____ RPM

18. Engine Information/graphs to be attached with this form:

*Engine speed vs. road speed
 Torque vs. engine speed
 Horsepower vs. engine speed
 Fuel consumption vs. engine speed.*

Vehicle speed vs. time (both loaded and unloaded)
Vehicle speed vs. grade (both loaded and unloaded)
Acceleration vs. time
Change of acceleration vs. time.

G. TRANSMISSION

1. Manufacturer _____
2. Type _____
3. Model Number _____
4. Speeds _____
5. Gear Ratios Forward _____ Reverse _____
6. Shift Speeds
 - a. 1st - 2nd _____ mph
 - b. 2nd - 3rd _____ mph
 - c. 3rd - 4th _____ mph
 - d. 4th - 5th (if applicable) _____ mph
 - e. 5th - 6th (if applicable) _____ mph
7. Fluid Capacity [Including heat exchanger and filter(s)] _____

H. VOLTAGE REGULATOR

1. Manufacturer _____
2. Model _____

I. VOLTAGE EQUALIZER

1. Manufacturer _____
2. Model _____

J. ALTERNATOR

1. Manufacturer _____
2. Type _____
3. Model _____
4. Output at Idle _____ Amps
5. Output at Maximum Speed _____ Amps
6. Maximum Warranted Speed _____ rpm
7. Speed at Idle _____ rpm
8. Drive Type _____

K. STARTER MOTOR

1. Manufacturer _____
2. Type _____
3. Model _____

L. AIR COMPRESSOR

1. Manufacturer _____
2. Type _____
3. Rated Capacity _____ cfm
4. Capacity, at Idle _____ cfm
5. Capacity, at Maximum Speed _____ cfm
6. Maximum Warranted Speed _____ rpm
7. Speed Idle _____ rpm
8. Drive Type _____ rpm
9. Governor
 - a) Cut-in Pressure _____ psi
 - b) Cut-Out Pressure _____ psi

M. AXLE, FRONT

1. Manufacturer _____
2. Type _____
3. Model Number _____

- 4. Gross Axle Weight Rating _____ lbs.
- 5. Axle Load _____ lbs.

N. AXLE, REAR

- 1. Manufacturer _____
- 2. Type _____
- 3. Model Number _____
- 4. Gross Axle Weight Rating _____ lbs.
- 5. Axle Load _____ lbs.
- 6. Axle Ratio _____

O. SUSPENSION SYSTEM

- 1. Manufacturer _____
- 2. Type: Front _____
Rear _____
- 3. Springs: Front _____
Rear _____

P. WHEELS AND TIRES

- 1. Wheels
 - a. Make _____
 - b. Size _____
 - c. Capacity _____ lbs.
 - d. Material _____
- 2. Tires
 - a. Manufacturer _____
 - b. Type _____
 - c. Size _____
 - d. Load Range/Air Press. _____ lbs/p.s.i.

Q. STEERING, POWER

- 1. Pump
 - a. Manufacturer & Model No. _____
 - b. Type _____
 - c. Relief Pressure _____ psi
- 2. Booster/Gear Box
 - a. Manufacturer & Model No. _____
 - b. Type _____
 - c. Ratio _____
- 3. Power Steering Fluid Capacity _____ gals
- 4. *Maximum Effort at Steering Wheel _____ lbs*
(unloaded stationary coach on dry asphalt pavement)
- 5. Steering Wheel Diameter _____ in.

R. BRAKES

- 1. Make of Fundamental Brake System _____
- 2. Brake Chambers Vendor's Size & Part No.
 - a. Front _____
 - b. Rear _____
- 3. Brake Operation Effort _____
- 4. Slack Adjuster's Vendor's Type & Part No.
 - a. Front
 - 1) Right _____
 - 2) Left _____

- b. Rear
 - 1) Right _____
 - 2) Left _____
 - c. Length
 - 1) Front Take-up _____ In.
 - 2) Rear Take-up _____ In.
- 5. Brake Drums/Discs
 - a. Front
 - 1) Manufacturer _____
 - 2) Part Number _____
 - 3) Diameter _____ in.
 - b. Rear
 - 1) Manufacturer _____
 - 2) Part Number _____
 - 3) Diameter _____ In.
- 6. Brake Lining Manufacturer Type _____
- 7. Brake Lining Identification
 - a. Front
 - 1) Forward _____
 - 2) Reverse _____
 - b. Rear
 - 1) Forward _____
 - 2) Reverse _____
- 8. Brake Linings Per shoe
 - a. Front _____
 - b. Rear _____
- 9. Brake Lining Widths
 - a. Front _____ In.
 - b. Rear _____ In.
- 10. Brake Lining Lengths
 - a. Front _____ In.
 - b. Rear _____ In.
- 11. Brake Lining Thickness _____ In.
- 12. Brake Lining Area Per Axle
 - a. Front _____ Sq. In.
 - b. Rear _____ Sq. In.

S. COOLING SYSTEM

- 1. Radiator/Charge Air Cooler
 - a. Manufacturer _____ / _____
 - b. Type _____ / _____
 - c. Model Number _____ / _____
 - d. Number of Tubes _____ / _____
 - e. Tubes Outer Diameter _____ In. / _____ In.
 - f. Fins Per Inch _____ Fins / _____ Fins
 - g. Fin Thickness _____ In. / _____ In.
- 2. Total Cooling and Heating System Capacity _____ Gals
- 3. Radiator Fan Speed Control _____ Type
- 4. Surge Tank, Capacity _____ Qts.
- 5. Engine Thermostat Temperature Setting
 - a. Initial Opening _____ ° F
 - b. Fully Closed _____ ° F
- 6. Overheat Alarm Temperature Sending Unit Setting _____ ° F
- 7. Shutdown Temperature Setting _____ ° F

T. AIR RESERVOIR CAPACITY

- 1. Supply Reservoir _____ Cu. In.
- 2. Primary Reservoir _____ Cu. In.
- 3. Secondary Reservoir _____ Cu. In.

- 4. Parking Reservoir _____ Cu. In.
- 5. Accessory Reservoir _____ Cu. In.
- 6. Other Reservoir Type _____ Cu. In.

U. HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

- 1. Heating System Capacity _____ B.T.U.
- 2. Air Conditioning Capacity _____ B.T.U.
- 3. Ventilating Capacity _____ cfm
- 4. Compressor
 - a. Manufacturer & Model _____
 - b. No. of Cylinders _____
 - c. Drive Ratio _____
 - d. Maximum Warranted Speed _____ r.p.m.
 - e. Operating Speed _____ r.p.m.
 - f. Weight _____ lbs.
 - g. Oil Capacity
 - 1) Dry _____ gals.
 - 2) Wet _____ gals.
 - h. Refrigerant _____ Type _____ Lbs.
- 5. Condenser
 - a. Manufacturer & Model _____
 - b. No. of Rows _____
 - c. No. of Fins/In. _____
 - d. O.D. of Tube _____ In.
 - e. Fin Thickness _____ In.
- 6. Condenser Fan
 - a. Manufacturer & Model _____
 - b. Fan Diameter _____ In.
 - c. Speed Maximum _____ RPM
 - d. Flow Rate (maximum) _____ CFM
- 7. Receiver
 - a. Manufacturer & Model _____
 - b. Capacity _____ Lbs.
- 8. Condenser Fan Drive Motors
 - a. Manufacturer _____
 - b. Model _____
 - c. Type _____
 - d. Horse Power _____ HP
 - e. Operating Speed _____ r.p.m.
- 9. Evaporator Fan Drive Motors
 - a. Manufacturer _____
 - b. Model _____
 - c. Type _____
 - d. Horse Power _____ HP
 - e. Operating Speed _____ r.p.m.
- 10. Evaporator(s)
 - a. Manufacturer & Model _____
 - b. Number of Rows _____
 - c. No. of Fins/In. _____
 - d. Outer Diameter of Tube _____ In.
 - e. Fin Thickness _____ In.
 - f. Number of Evaporator _____
- 11. Expansion Valve
 - Manufacturer & Model _____
- 12. Filter-Drier
 - Manufacturer & Model _____
- 13. Heater Cores
 - a. Manufacturer & Model _____
 - b. Capacity _____ B.T.U.
 - c. Number of Rows _____
 - d. Number of Fins/In. _____

- e. Outer Diameter of Tube _____ In.
 - f. Fin Thickness _____ In.
 - g. Number of Heater Cores _____
14. Floor Heater Blowers
- a. Heater Blower Motors
 - 1) Manufacturer & Model _____
 - 2) Horsepower _____ HP
 - 3) Speed(s) _____ r.p.m.
 - b. Heater Blower Wheel
 - Manufacturer & Model _____
 - Capacity _____ cfm
 - c. Cores
 - Manufacturer & Model _____
 - Capacity _____ B.T.U.
 - Number of Rows _____
 - Number of Fins/In. _____ Fins
 - Outer Diameter of Tube _____ In.
 - Fin Thickness _____ In.
 - Number of Heater Cores _____
15. Controls
- a. Manufacturer & Model _____
 - b. Type _____
16. Driver's Heater
- a. Manufacturer _____
 - b. Model No. _____
 - c. Capacity _____ B.T.U.
17. Ventilation System
- Type _____
18. Coolant Heater
- Make & Model _____

Capacity(B.T.U) _____

V. INTERIOR LIGHTING

- 1. Manufacturer _____
- 2. Type _____
- 3. Number of Fixtures _____
- 4. Size of Fixtures _____
- 5. Power Pack _____

W. DOORS

- 1. Front
 - a. Manufacturer of Operating Equipment _____
 - b. Type of Door _____
 - c. Type of Operating Equipment _____
- 2. Rear
 - a. Manufacturer of Operating Equipment _____
 - b. Type door _____
 - c. Type of Operating Equipment _____

X. PASSENGER WINDOWS

- 1. Manufacturer _____
- 1. Model _____
- 2. Type _____
- 3. Number:(Side) _____
(Rear) _____
- 4. Sizes: _____
- 5. Glazing: Type _____
Thickness _____
Color of Tint _____
Light Transmission _____

Y. MIRRORS

	<u>Size</u>	<u>Type</u>	<u>Manufacturer</u>	<u>Mfg. Part #</u>	<u>Model No.</u>
Right Side Exterior	_____	_____	_____	_____	_____
Left Side Exterior	_____	_____	_____	_____	_____
Left Side Exterior	_____	_____	_____	_____	_____
Center Rearview	_____	_____	_____	_____	_____
Upper-Right Hand Corner	_____	_____	_____	_____	_____
Rear Exit Area	_____	_____	_____	_____	_____

Z. SEATS

- 1. Manufacturer _____
- 2. Model _____
- 3. Type _____

AA. PAINT

- Manufacturer _____
- Type _____

BB. WHEELCHAIR RAMP EQUIPMENT

- 1. Manufacturer & Model No. _____
- 2. Type _____
- 3. Capacity _____ Lbs.
- 4. Dimensions _____



- a. Width of Platform _____ In.
- b. Length of Platform _____ In.
- 5. System Fluid Capacity _____ Qts.
- 6. Type Fluid Used _____
- 7. Operating Hydraulic Pressure _____
- 8. Hydraulic Cylinders _____ psi
 - A) Size _____
 - B) Number _____

CC. WHEELCHAIR SECUREMENT EQUIPMENT

- 1. Manufacturer & Model No. _____

DD. DESTINATION SIGNS

- 1. Manufacturer _____
- 2. Type _____
- 3. Character Length
 - Front Destination _____ In.
 - Front Run Number _____ In.
 - Side Destination _____ In.
 - Rear Route _____ In.
- 4. Character Height
 - Front Destination _____ In.
 - Front Run Number _____ In.
 - Side Destination _____ In.
 - Rear Route _____ In.
- 5. Number of Characters
 - Front Destination _____ In.
 - Front Run Number _____ In.
 - Side Destination _____ In.
 - Rear Route _____ In.
 - Rear _____ In.
- 6. Message Width
 - Front Destination _____ In.
 - Front Run Number _____ In.
 - Side Destination _____ In.
 - Rear Route _____ In.

EE. ELECTRICAL

- 1. Multiplex System
 - a. Manufacturer _____
 - b. Model No. _____

FF. BATTERIES

- a. Manufacturer _____
- b. Model No. _____
- c. Type _____

GG. PASSENGER INTERIOR LIGHTING

- Manufacturer _____
- Model No. _____

HH. COMMUNICATION SYSTEM

- 1. GPS
 - a. Manufacturer _____

- b. Model No. _____
2. P.A. System
- | | <u>Manufacturer</u> | <u>Model No.</u> | |
|------------------|---------------------|------------------|------------------|
| a. Amplifier | _____ | _____ | |
| b. Microphone | _____ | _____ | |
| c. Int. Speakers | _____ | _____ | (number
____) |
| d. Ext. Speaker | _____ | _____ | (number
____) |

Optional Add-ons

Base Price (Hybrid/Electric):

- a) Standard 30' Low Floor Bus: _____
- b) Restyled 30' Low Floor Bus: _____
- c) BRT style 30' Low Floor Bus: _____
-
- a) Standard 35' Low Floor Bus: _____
- b) Restyled 35' Low Floor Bus: _____
- c) BRT style 35' Low Floor Bus: _____
-
- a) Standard 40' Low Floor Bus: _____
- b) Restyled 40' Low Floor Bus: _____
- c) BRT style 40' Low Floor Bus: _____

1) Bike Rack

- a) *SPORTWORKS* model DL2-NP S/S (stainless steel) bicycle racks, including mount and pivot. _____

2) Farebox

- a) Diamond RV _____
- b) Odyssey (GFI) _____

3) Radio (Voice)

- a) Motorola MOTOTRBO XPR4550 25-40W _____
with remote mounted head and RRA4656A
transit antenna installed, including all necessary
power and antenna cables and appropriate
programming per Procuring Agency.

4) Driver's Seat

- a) Recaro Ergo AM80 _____
- b) USSC 9100ALX _____

5) Passenger Seating

- a) Angel (4One LLC) _____
Wheelchair Securement System _____
- b) Aries (4One LLC) _____
Wheelchair Securement System _____

- c) AMSECO Insight _____
Wheelchair Securement System _____
 - d) AMSECO Metropolitan _____
Wheelchair Securement System _____

 - 6) Flush glass design windows. _____

 - 7) Transmission
 - a) Voith _____
 - b) Allison _____

 - 8) HVAC
 - a) Thermo King _____
 - b) Carrier _____

 - 9) Overhead interior lighting (in place of LED system)
 - a) Pretoria fluorescent _____

 - 10) Destination Sign - Front, side, rear and bus block numbers
 - a) Luminator LED _____
 - b) Twin Vision LED _____

 - 11) Automatic Stop Announcement System
 - a) Luminator _____
 - b) Digital Recorders DR600 _____
 - c) Talking Bus System _____

 - 12) Video Camera Recording System (Six camera digital recording system, 30 frames per second, GPS, Wi-Fi, 20 hour DVR)
 - a) GE Interlogix Mobile View _____
 - b) Safety Vision _____
 - c) Apollo Roadrunner _____
 - d) SEON _____
 - e) Spare hard drive _____

 - 13) Spare Engine Package) _____

 - 14) Additional training per 40 hours:
 - a) Engine _____
 - b) Transmission _____
 - c) HVAC _____
 - d) Destination Sign _____
-

ATTACHMENT K VEHICLE TECHNICAL INFORMATION

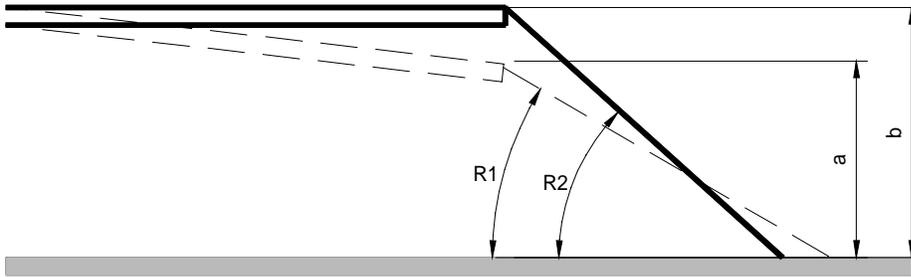
Lot 1 TYPE I

The Offeror shall submit for review by the Procuring Agency a completely filled-in Vehicle Technical Information form below to confirm his proposed vehicle and components are in compliance with the requirements of Part 5: Technical Specifications.

- A. BUS MANUFACTURER _____
Bus Model _____
- B. UNDERSTRUCTURE MANUFACTURER _____
Model Number _____
- C. BASIC BODY CONSTRUCTION
1. Type _____
 2. Tubing or frame member Thickness & Dimensions
 - a. Overstructure _____
 - b. Understructure _____
 3. Skin Thickness and Material
 - a. Roof _____
 - b. Sidewall _____
 - c. Skirt Panel _____
 - d. Front End _____
 - e. Rear End _____
- D. DIMENSIONS
1. Overall Length
 - a. Over Bumpers _____ Ft. _____ In.
 - b. Over Body _____ Ft. _____ In.
 2. Overall Width
 - a. Over Body excluding Mirrors _____ In.
 - b. Over Body including Mirrors - driving position _____ In.
 - c. Over Tires Front Axles _____ In.
 - d. Over Tires Rear Axles _____ In.
 3.
 - a. Over all Height (maximum) _____ In.
 - b. Overall Height (main roof line) _____ In.
 4. Angle of Approach _____ Deg.
 5. Breakover Angle _____ Deg.
 6. Angle of Departure _____ Deg.
 7. Doorway Dimensions

	<u>Front</u>	<u>Rear</u>
A. Width Between Door Posts	_____ in	_____ in
B. Door Width Between Panels	_____ in	_____ in
C. Clear Door		
in		
Width _____ in	_____ in	
D. Doorway Height	_____ in	_____ in
E. Knuckle Clearance	_____ in	_____ in

8. Step Height from Ground (measured at center of doorway)



	<u>Front Doorway, Empty</u>	<u>Ramp Angle</u>	<u>Rear Doorway, Empty</u>
(Kneeled)	a. _____ inches	R1 _____ deg.	a. _____ inches
(Unkneeled)	b. _____ inches	R2 _____ deg.	b. _____ inches

9. Interior Head Room (center of aisle)

a. Front Axle Location _____ In.
 b. Drive Axle Location _____ In.

10. Aisle Width Between Transverse Seats (minimum) _____ In.

11. Floor Height Above Ground (centerline of bus)

a. at Front door _____ In.
 b. at Front Axle _____ In.
 c. at Drive Axle _____ In.
 d. at Rear door _____ In.

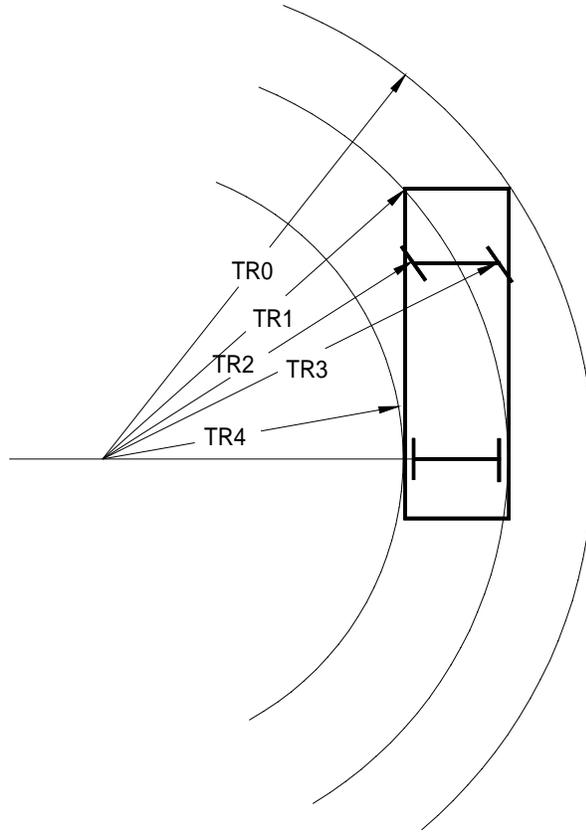
12. Minimum Ground Clearance (between bus and ground, with bus unkneeled)

a. Excluding Axles _____ In.
 b. Including Axles _____ In.

13. Horizontal Turning Envelope (see diagram below)

a. Outside Body Turning Radius, TR0
 (including bumper) _____ Ft. _____ In.
 b. Front Inner Corner Radius, TR1 _____ Ft. _____ In.
 c. Front Wheel Inner Turning Radius, TR2 _____ Ft. _____ In.
 d. Front Wheel Outer Turning Radius, TR3 _____ Ft. _____ In.

e. Inside Body Turning Radius, TR4 _____ Ft. _____ In.
 (including bumper)



14. Wheelbase _____ In.

15. Overhang, Centerline of Axle Over Bumper
 a. Front _____ Ft. _____ In.
 b. Rear _____ Ft. _____ In.

16. Floor
 a. Interior Length _____ Ft. _____ In.
 b. Interior Width (excluding coving) _____ Ft. _____ In.
 c. Total Standee Area _____ Sq. Ft.
 d. Minimum distance between Wheelhouses:
 Front: _____ In.
 Rear: _____ In.
 e. Maximum interior floor slope
 (from horizontal) _____ Deg.

17. Passenger Capacity Provided
 a. Total Maximum Seating _____
 b. Standee Capacity _____
 c. Minimum Knee to Hip Room _____ In.
 d. Minimum Foot Room _____ In.

E. WEIGHT OF BUS

	No. of People	Front Axle			Rear Axle			TOTAL BUS
		Left	Right	Total	Left	Right	Total	
Empty Bus Full Fuel and Farebox	0							
Fully Seated Full Fuel and Farebox	_____ + Driver							
Fully Loaded Standee and Fully Seated Full Fuel and Farebox	_____ + Driver							
Crush Load (1.5xFully Loaded)	_____							
GVWR								
GAWR								

F. ENGINE, MAIN

1. Manufacturer _____
2. Type _____
3. Model Number _____
4. No. of Cylinders _____
5. Bore _____ In.
6. Stroke _____ In.
7. Displacement _____ Cu. In.
8. Compression Ratio _____
9. Injector Type and Size _____
10. Net S.A.E. Horsepower _____ HP at _____ RPM
11. Net S.A.E. Torque _____ lb. ft. at _____ RPM
12. Crankcase Oil Capacity
 - a. New Engine, dry _____ gals.
 - b. New Engine, wet _____ gals.
13. Turbocharger, Make & Model _____
14. Maximum Speed, no load _____ RPM
15. Maximum Speed, full load _____ RPM
16. Speed at Idle _____ RPM
17. Speed at Fast Idle _____ RPM

18. Engine Information/graphs to be attached with this form:

*Engine speed vs. road speed
 Torque vs. engine speed
 Horsepower vs. engine speed
 Fuel consumption vs. engine speed.*

Vehicle speed vs. time (both loaded and unloaded)
Vehicle speed vs. grade (both loaded and unloaded)
Acceleration vs. time
Change of acceleration vs. time.

G. TRANSMISSION

1. Manufacturer _____
2. Type _____
3. Model Number _____
4. Speeds _____
5. Gear Ratios Forward _____ Reverse _____
6. Shift Speeds
 - a. 1st - 2nd _____ mph
 - b. 2nd - 3rd _____ mph
 - c. 3rd - 4th _____ mph
 - d. 4th - 5th (if applicable) _____ mph
 - e. 5th - 6th (if applicable) _____ mph
7. Fluid Capacity [Including heat exchanger and filter(s)] _____

H. VOLTAGE REGULATOR

1. Manufacturer _____
2. Model _____

I. VOLTAGE EQUALIZER

1. Manufacturer _____
2. Model _____

J. ALTERNATOR

1. Manufacturer _____
2. Type _____
3. Model _____
4. Output at Idle _____ Amps
5. Output at Maximum Speed _____ Amps
6. Maximum Warranted Speed _____ rpm
7. Speed at Idle _____ rpm
8. Drive Type _____

K. STARTER MOTOR

1. Manufacturer _____
2. Type _____
3. Model _____

L. AIR COMPRESSOR

1. Manufacturer _____
2. Type _____
3. Rated Capacity _____ cfm
4. Capacity, at Idle _____ cfm
5. Capacity, at Maximum Speed _____ cfm
6. Maximum Warranted Speed _____ rpm
7. Speed Idle _____ rpm
8. Drive Type _____ rpm
9. Governor
 - a) Cut-in Pressure _____ psi
 - b) Cut-Out Pressure _____ psi

M. AXLE, FRONT

1. Manufacturer _____
2. Type _____
3. Model Number _____

- 4. Gross Axle Weight Rating _____ lbs.
- 5. Axle Load _____ lbs.

N. AXLE, REAR

- 1. Manufacturer _____
- 2. Type _____
- 3. Model Number _____
- 4. Gross Axle Weight Rating _____ lbs.
- 5. Axle Load _____ lbs.
- 6. Axle Ratio _____

O. SUSPENSION SYSTEM

- 1. Manufacturer _____
- 2. Type: Front _____
Rear _____
- 3. Springs: Front _____
Rear _____

P. WHEELS AND TIRES

- 1. Wheels
 - a. Make _____
 - b. Size _____
 - c. Capacity _____ lbs.
 - d. Material _____
- 2. Tires
 - a. Manufacturer _____
 - b. Type _____
 - c. Size _____
 - d. Load Range/Air Press. _____ lbs/p.s.i.

Q. STEERING, POWER

- 1. Pump
 - a. Manufacturer & Model No. _____
 - b. Type _____
 - c. Relief Pressure _____ psi
- 2. Booster/Gear Box
 - a. Manufacturer & Model No. _____
 - b. Type _____
 - c. Ratio _____
- 3. Power Steering Fluid Capacity _____ gals
- 4. *Maximum Effort at Steering Wheel _____ lbs*
(unloaded stationary coach on dry asphalt pavement)
- 5. Steering Wheel Diameter _____ in.

R. BRAKES

- 1. Make of Fundamental Brake System _____
- 2. Brake Chambers Vendor's Size & Part No.
 - a. Front _____
 - b. Rear _____
- 3. Brake Operation Effort _____
- 4. Slack Adjuster's Vendor's Type & Part No.
 - a. Front
 - 1) Right _____
 - 2) Left _____

- b. Rear
 - 1) Right _____
 - 2) Left _____
 - c. Length
 - 1) Front Take-up _____ In.
 - 2) Rear Take-up _____ In.
- 5. Brake Drums/Discs
 - a. Front
 - 1) Manufacturer _____
 - 2) Part Number _____
 - 3) Diameter _____ in.
 - b. Rear
 - 1) Manufacturer _____
 - 2) Part Number _____
 - 3) Diameter _____ In.
- 6. Brake Lining Manufacturer Type _____
- 7. Brake Lining Identification
 - a. Front
 - 1) Forward _____
 - 2) Reverse _____
 - b. Rear
 - 1) Forward _____
 - 2) Reverse _____
- 8. Brake Linings Per shoe
 - a. Front _____
 - b. Rear _____
- 9. Brake Lining Widths
 - a. Front _____ In.
 - b. Rear _____ In.
- 10. Brake Lining Lengths
 - a. Front _____ In.
 - b. Rear _____ In.
- 11. Brake Lining Thickness _____ In.
- 12. Brake Lining Area Per Axle
 - a. Front _____ Sq. In.
 - b. Rear _____ Sq. In.

S. COOLING SYSTEM

- 1. Radiator/Charge Air Cooler
 - a. Manufacturer _____ / _____
 - b. Type _____ / _____
 - c. Model Number _____ / _____
 - d. Number of Tubes _____ / _____
 - e. Tubes Outer Diameter _____ In. / _____ In.
 - f. Fins Per Inch _____ Fins / _____ Fins
 - g. Fin Thickness _____ In. / _____ In.
- 2. Total Cooling and Heating System Capacity _____ Gals
- 3. Radiator Fan Speed Control _____ Type
- 4. Surge Tank, Capacity _____ Qts.
- 5. Engine Thermostat Temperature Setting
 - a. Initial Opening _____ ° F
 - b. Fully Closed _____ ° F
- 6. Overheat Alarm Temperature Sending Unit Setting _____ ° F
- 7. Shutdown Temperature Setting _____ ° F

T. AIR RESERVOIR CAPACITY

- 1. Supply Reservoir _____ Cu. In.
- 2. Primary Reservoir _____ Cu. In.
- 3. Secondary Reservoir _____ Cu. In.

- 4. Parking Reservoir _____ Cu. In.
- 5. Accessory Reservoir _____ Cu. In.
- 6. Other Reservoir Type _____ Cu. In.

U. HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

- 1. Heating System Capacity _____ B.T.U.
- 2. Air Conditioning Capacity _____ B.T.U.
- 3. Ventilating Capacity _____ cfm
- 4. Compressor
 - a. Manufacturer & Model _____
 - b. No. of Cylinders _____
 - c. Drive Ratio _____
 - d. Maximum Warranted Speed _____ r.p.m.
 - e. Operating Speed _____ r.p.m.
 - f. Weight _____ lbs.
 - g. Oil Capacity
 - 1) Dry _____ gals.
 - 2) Wet _____ gals.
 - h. Refrigerant _____ Type _____ Lbs.
- 5. Condenser
 - a. Manufacturer & Model _____
 - b. No. of Rows _____
 - c. No. of Fins/In. _____
 - d. O.D. of Tube _____ In.
 - e. Fin Thickness _____ In.
- 6. Condenser Fan
 - a. Manufacturer & Model _____
 - b. Fan Diameter _____ In.
 - c. Speed Maximum _____ RPM
 - d. Flow Rate (maximum) _____ CFM
- 7. Receiver
 - a. Manufacturer & Model _____
 - b. Capacity _____ Lbs.
- 8. Condenser Fan Drive Motors
 - a. Manufacturer _____
 - b. Model _____
 - c. Type _____
 - d. Horse Power _____ HP
 - e. Operating Speed _____ r.p.m.
- 9. Evaporator Fan Drive Motors
 - a. Manufacturer _____
 - b. Model _____
 - c. Type _____
 - d. Horse Power _____ HP
 - e. Operating Speed _____ r.p.m.
- 10. Evaporator(s)
 - a. Manufacturer & Model _____
 - b. Number of Rows _____
 - c. No. of Fins/In. _____
 - d. Outer Diameter of Tube _____ In.
 - e. Fin Thickness _____ In.
 - f. Number of Evaporator _____
- 11. Expansion Valve
 - Manufacturer & Model _____
- 12. Filter-Drier
 - Manufacturer & Model _____
- 13. Heater Cores
 - a. Manufacturer & Model _____
 - b. Capacity _____ B.T.U.
 - c. Number of Rows _____
 - d. Number of Fins/In. _____

- e. Outer Diameter of Tube _____ In.
 - f. Fin Thickness _____ In.
 - g. Number of Heater Cores _____
14. Floor Heater Blowers
- a. Heater Blower Motors
 - 1) Manufacturer & Model _____
 - 2) Horsepower _____ HP
 - 3) Speed(s) _____ r.p.m.
 - b. Heater Blower Wheel
 - Manufacturer & Model _____
 - Capacity _____ cfm
 - c. Cores
 - Manufacturer & Model _____
 - Capacity _____ B.T.U.
 - Number of Rows _____
 - Number of Fins/In. _____ Fins
 - Outer Diameter of Tube _____ In.
 - Fin Thickness _____ In.
 - Number of Heater Cores _____
15. Controls
- a. Manufacturer & Model _____
 - b. Type _____
16. Driver's Heater
- a. Manufacturer _____
 - b. Model No. _____
 - c. Capacity _____ B.T.U.
17. Ventilation System
- Type _____
18. Coolant Heater
- Make & Model _____

Capacity(B.T.U) _____

V. INTERIOR LIGHTING

- 1. Manufacturer _____
- 2. Type _____
- 3. Number of Fixtures _____
- 4. Size of Fixtures _____
- 5. Power Pack _____

W. DOORS

- 1. Front
 - a. Manufacturer of Operating Equipment _____
 - b. Type of Door _____
 - c. Type of Operating Equipment _____
- 2. Rear
 - a. Manufacturer of Operating Equipment _____
 - b. Type door _____
 - c. Type of Operating Equipment _____

X. PASSENGER WINDOWS

- 1. Manufacturer _____
- 1. Model _____
- 2. Type _____
- 3. Number:(Side) _____
(Rear) _____
- 4. Sizes: _____
- 5. Glazing: Type _____
Thickness _____
Color of Tint _____
Light Transmission _____

Y. MIRRORS

	<u>Size</u>	<u>Type</u>	<u>Manufacturer</u>	<u>Mfg. Part #</u>	<u>Model No.</u>
Right Side Exterior	_____	_____	_____	_____	_____
Left Side Exterior	_____	_____	_____	_____	_____
Left Side Exterior	_____	_____	_____	_____	_____
Center Rearview	_____	_____	_____	_____	_____
Upper-Right Hand Corner	_____	_____	_____	_____	_____
Rear Exit Area	_____	_____	_____	_____	_____

Z. SEATS

- 1. Manufacturer _____
- 2. Model _____
- 3. Type _____

AA. PAINT

- Manufacturer _____
- Type _____

BB. WHEELCHAIR RAMP EQUIPMENT

- 1. Manufacturer & Model No. _____
- 2. Type _____
- 3. Capacity _____ Lbs.
- 4. Dimensions _____



- a. Width of Platform _____ In.
- b. Length of Platform _____ In.
- 5. System Fluid Capacity _____ Qts.
- 6. Type Fluid Used _____
- 7. Operating Hydraulic Pressure _____
- 8. Hydraulic Cylinders _____ psi
 - A) Size _____
 - B) Number _____

CC. WHEELCHAIR SECUREMENT EQUIPMENT

- 1. Manufacturer & Model No. _____

DD. DESTINATION SIGNS

- 1. Manufacturer _____
- 2. Type _____
- 3. Character Length
 - Front Destination _____ In.
 - Front Run Number _____ In.
 - Side Destination _____ In.
 - Rear Route _____ In.
- 4. Character Height
 - Front Destination _____ In.
 - Front Run Number _____ In.
 - Side Destination _____ In.
 - Rear Route _____ In.
- 5. Number of Characters
 - Front Destination _____ In.
 - Front Run Number _____ In.
 - Side Destination _____ In.
 - Rear Route _____ In.
 - Rear _____ In.
- 6. Message Width
 - Front Destination _____ In.
 - Front Run Number _____ In.
 - Side Destination _____ In.
 - Rear Route _____ In.

EE. ELECTRICAL

- 1. Multiplex System
 - a. Manufacturer _____
 - b. Model No. _____

FF. BATTERIES

- a. Manufacturer _____
- b. Model No. _____
- c. Type _____

GG. PASSENGER INTERIOR LIGHTING

- Manufacturer _____
- Model No. _____

HH. COMMUNICATION SYSTEM

- 1. GPS
 - a. Manufacturer _____

- b. Model No. _____
2. P.A. System
- | | <u>Manufacturer</u> | <u>Model No.</u> | |
|------------------|---------------------|------------------|------------------|
| a. Amplifier | _____ | _____ | |
| b. Microphone | _____ | _____ | |
| c. Int. Speakers | _____ | _____ | (number
____) |
| d. Ext. Speaker | _____ | _____ | (number
____) |

Optional Add-ons

Base Price (Hybrid/Electric):

- a) Standard 30' Low Floor Bus: _____
- b) Restyled 30' Low Floor Bus: _____
- c) BRT style 30' Low Floor Bus: _____
-
- a) Standard 35' Low Floor Bus: _____
- b) Restyled 35' Low Floor Bus: _____
- c) BRT style 35' Low Floor Bus: _____
-
- a) Standard 40' Low Floor Bus: _____
- b) Restyled 40' Low Floor Bus: _____
- c) BRT style 40' Low Floor Bus: _____

1) Bike Rack

- a) *SPORTWORKS* model DL2-NP S/S (stainless steel) bicycle racks, including mount and pivot. _____

2) Farebox

- a) Diamond RV _____
- b) Odyssey (GFI) _____

3) Radio (Voice)

- a) Motorola MOTOTRBO XPR4550 25-40W _____
with remote mounted head and RRA4656A
transit antenna installed, including all necessary
power and antenna cables and appropriate
programming per Procuring Agency.

4) Driver's Seat

- a) Recaro Ergo AM80 _____
- b) USSC 9100ALX _____

5) Passenger Seating

- a) Angel (4One LLC) _____
Wheelchair Securement System _____
- b) Aries (4One LLC) _____
Wheelchair Securement System _____

- c) AMSECO Insight _____
Wheelchair Securement System _____
 - d) AMSECO Metropolitan _____
Wheelchair Securement System _____

 - 6) Flush glass design windows. _____

 - 7) Transmission
 - a) Voith _____
 - b) Allison _____

 - 8) HVAC
 - a) Thermo King _____
 - b) Carrier _____

 - 9) Overhead interior lighting (in place of LED system)
 - a) Pretoria fluorescent _____

 - 10) Destination Sign - Front, side, rear and bus block numbers
 - a) Luminator LED _____
 - b) Twin Vision LED _____

 - 11) Automatic Stop Announcement System
 - a) Luminator _____
 - b) Digital Recorders DR600 _____
 - c) Talking Bus System _____

 - 12) Video Camera Recording System (Six camera digital recording system, 30 frames per second, GPS, Wi-Fi, 20 hour DVR)
 - a) GE Interlogix Mobile View _____
 - b) Safety Vision _____
 - c) Apollo Roadrunner _____
 - d) SEON _____
 - e) Spare hard drive _____

 - 13) Spare Engine Package) _____

 - 14) Additional training per 40 hours:
 - a) Engine _____
 - b) Transmission _____
 - c) HVAC _____
 - d) Destination Sign _____
-

Attachment L

BID SUBMISSION FOR SEALED COMBINED TWO-STEP INVITATION FOR SEALED BIDS (IFB)

Only paper submissions will be accepted for this solicitation. Read this entire term and condition prior to submitting your proposal.

Offeror must print and sign the "Solicitation Paper Response" document for this COMBINED TWO-STEP INVITATION FOR SEALED BIDS and submit it with their hardcopy sealed bid.

The "Solicitation Paper Response" document can be printed from the Division of Purchasing and Supply eVA web site at www.eva.virginia.gov. To print the document, go to the eVA website and click on "Solicitations and Awards". In the Keyword Search field, type in the word "SMITH" (no quotes) and click the "Search" button. Look for IFB 155 "Type I and Type II Low Floor Transit Buses". Click on the "Details" button. Details of the solicitation are shown, including the RFP attachments.

To view the "Solicitation Paper Response" document, click the "Respond By Mail" button under "Response Options". **IMPORTANT: ONLY PAPER SUBMISSIONS WILL BE ACCEPTED FOR THIS SOLICITATION. DO NOT USE THE "RESPOND ONLINE" BUTTON UNDER "RESPONSE OPTIONS".** To print the "Solicitation Paper Response" document, click the "Send to Printer" box.

The bidder shall return their signed bid in a sealed envelope. The envelope should be addressed as follows:

For proposals sent via an express delivery service, send the bid to the Commonwealth of Virginia, Department of General Services, Division of Purchases and Supply, 1st Floor at 1111 East Broad Street, Richmond, VA 23219.

For hand-delivered bids, deliver the bid to the Commonwealth of Virginia, Department of General Services, Division of Purchases and Supply, 1st Floor at 1111 East Broad Street, Richmond, VA 23219.

For Bids sent via the U.S. Postal Service, send the bid to the Commonwealth of Virginia, Department of General Services, Division of Purchases and Supply, P.O. Box 1199, Richmond, VA 23218-1199. If mailed

via the U.S. Postal Service, the bidder must allow sufficient time for the bid to make its way through the Commonwealth's Mail Security Processing System prior to delivery to Bid Receiving.

For all bids, make sure the 2STP Invitation for Bids (IFB) name and number are clearly visible on the outside of the envelope. The envelope should also provide the following information: Name of Offeror, Street or Box Number, City, State, Zip Code; and Solicitation Close Date and Time, Solicitation No., Solicitation Description, and Contract/Purchase Officer. If a solicitation response is not contained in an envelope as described above the bidder takes the risk that the envelope may be inadvertently opened and the information compromised which may cause the bid to be disqualified. No other un-requested correspondence or other bids should be placed in the envelope. The Commonwealth is not responsible if the solicitation response does not reach Bid Receiving by the appointed day and time.

Important: Amendments to the IFB may be made by the Commonwealth, and bidder acknowledgments of amendments must be received at Bid Receiving either prior to the bid due date and hour or attached to your bid. Before submitting your bid, and prior to the bid due date and time, check the eVA website to confirm if any amendments have been issued. If an amendment has been made, re-print the "Solicitation Paper Response" document, acknowledge the amendment on the appropriate line of the "Reminders" section, and send in the revised "Solicitation Paper Response" document.

ATTACHMENT M
Small Business Utilization Plan

Definitions

Small Business: "Small business " means an independently owned and operated business which, together with affiliates, has 250 or fewer employees, or average annual gross receipts of \$10 million or less averaged over the previous three years. Note: DMBE-certified women- and minority-owned businesses shall also be considered small businesses when they have received DMBE small business certification.

Women-Owned Business: Women-owned business means a business concern that is at least 51% owned by one or more women who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, or in the case of a corporation, partnership or limited liability company or other entity, at least 51% of the equity ownership interest is owned by one or more women who are citizens of the United States or non-citizens who are in full compliance with United States immigration law, and both the management and daily business operations are controlled by one or more women who are citizens of the United States or non-citizens who are in full compliance with the United States immigration law.

Minority-Owned Business: Minority-owned business means a business concern that is at least 51% owned by one or more minority individuals or in the case of a corporation, partnership or limited liability company or other entity, at least 51% of the equity ownership interest in the corporation, partnership, or limited liability company or other entity is owned by one or more minority individuals and both the management and daily business operations are controlled by one or more minority individuals.

All small businesses must be certified by the Commonwealth of Virginia, Department of Minority Business Enterprise (DMBE) to participate in the SWAM program. Certification applications are available through DMBE online at www.dmbv.virginia.gov (Customer Service).

Bidder/Offeror Name: _____

Preparer Name: _____

Date:

Instructions

- A. If you are certified by the Department of Minority Business Enterprise (DMBE) as a small business, complete only Section A of this form. This shall include, but not limited to, DMBE-certified women-owned and minority-owned businesses when they have received DMBE small business certification.
- B. If you are not certified by DMBE as a small business and plan to subcontract part of this contract with a DMBE certified business, complete only Section B of this form.

Section A

If your firm is certified by the Department of Minority Business Enterprise (DMBE), are you certified as a **(check only one below):**

- _____ Small Business
- _____ Small and Women-owned Business
- _____ Small and Minority-owned Business

Certification number: _____ Certification date: _____

ATTACHMENT M Continued

Section B

Populate the table below to show your firm's plans for utilization of DMBE-certified small businesses in the performance of this contract. This shall include, but not limited to, DMBE-certified women-owned and minority-owned businesses that meet the small business definition and have received the DMBE small business certification. Include plans to utilize small businesses as part of joint ventures, partnerships, subcontractors, suppliers, etc.

B. Plans for Utilization of DMBE-Certified Small Businesses for this Procurement

Small Business Name & Address DMBE Certificate #	Status if Small Business is also: Women (W), Minority (M)	Contact Person, Telephone & Email	Type of Goods and/or Services	Planned Contract Involvement	Planned Annual Contract Dollar Expenditure Amount
Totals \$					

Master Agreement - E194 - 1268
New Flyer Industries Lot 1 and Lot 2

Contract Number: E194-1268

Document Id: 1268

Title: Low Floor Transit Buses

Print Date: 7/1/2011

Procurement Folder: 61762

Procurement Type: Complex IFB

Effective Begin Date:

Expiration Date:

Minimum Order Amount: \$0.00

Maximum Order Amount: \$0.00

Contact Information

Sandra White (Smith)

Phone: 804-786-0078

Email: sandra.smith@dgs.virginia.gov

Renewal Periods

Line Number	Renewal Period Length	Renewal Period Unit	Effective Date	Expiration Date	Notification Days (Prior to Expiration)
1	1	Years	7/5/2011	7/4/2012	120
2	1	Years	7/5/2012	7/4/2013	120
3	1	Years	7/5/2013	7/4/2014	120
4	1	Years	7/5/2014	7/4/2015	120

Authorized Departments

Line Number	Department	Spending Limit	No Limit	Active	Exclude this Dept.	Ordered Amount
1	DRPT	\$0.00	Yes	Yes	No	\$0.00

Vendor

Legal Name: New Flyer Industries Canada ULC Contact Name: Sue Anderson

Location Legal Name: Parts Organization Contact Email: quotes_parts@newflyer.com

Contact Phone: 800-665-2637 Vendor Type: Primary

MA Number: - E194-1268

Lines

Line: 1

Line Type: Item

Description: Lot 1 - 40' Low Floor Transit
Buses See Approved Specifications and Pricing
Schedule

Quantity:

Unit: each

Unit Price: \$359,162.91000

Line Total: \$359,162.91

Estimated Delivery Days: Setup with Customer

Delivery Type: Per Specifications

FOB Destination-Freight Prepaid

Shipping Country: US

Billing Country: US

Shipping Instructions: Various Agencies and
Public Bodies

Line: 2

Line Type: Item

Description: Lot 1 - 35' Low Floor Transit
Buses See the approved Specifications and
Pricing Schedule.

Quantity:

Unit: each

Unit Price: \$368,077.68000

Line Total: \$368,077.68

Estimated Delivery Days: Setup with Customer

Delivery Type: Per Specifications

FOB Destination-Freight Prepaid

Shipping Country: US

Billing Country: US

Shipping Instructions: Various Agencies and
Public Bodies

Line: 3

Line Type: Item

Description: Lot 1 - 30' Low Floor Transit
Buses See Approved Specifications and Pricing
Schedule

Quantity:

Unit: each

Unit Price: \$372,441.37000

Line Total: \$372,441.37

Estimated Delivery Days: Setup with Customer Delivery Type: Per Specifications

FOB Destination-Freight Prepaid

Shipping Country: US

Billing Country: US

Shipping Instructions: Various Agencies and
Public Bodies

Line: 4

Line Type: Item

Description: Lot 2 - 40' Low Floor Transit
Buses, See approved Specifications and Pricing
Schedule.

Quantity:

Unit: each

Unit Price: \$362,641.71000

Line Total: \$362,641.71

Estimated Delivery Days: Setup with Customer Delivery Type: Per Specifications

FOB Destination-Freight Prepaid

Shipping Country: US

Billing Country: US

Shipping Instructions: Various Agencies and
Public Bodies

Line: 5

Line Type: Item

Description: Lot 2 - 30' Low Floor Transit
Buses See approved Specifications and Pricing
Schedule.

Quantity:

Unit: each

Unit Price: \$371,556.48000

Line Total: \$371,556.48

Estimated Delivery Days: Setup with Customer Delivery Type: Per Specifications

FOB Destination-Freight Prepaid

Shipping Country: US

Billing Country: US

Shipping Instructions: Various Agencies and
Public Bodies

Line: 6

Line Type: Item

Description: Lot 2 - 35' Low Floor Transit
Buses See approved Specifications and Pricing
Schedule.

Quantity: Unit: each
Unit Price: \$375,920.17000 Line Total: \$375,920.17
Estimated Delivery Days: Setup with Customer Delivery Type: Per Specifications
FOB Destination-Freight Prepaid

Shipping Country: US Billing Country: US
Shipping Instructions: Various Agencies and
Public Bodies

Terms and Conditions

GENERAL TERMS AND CONDITIONS

VENDORS MANUAL: This solicitation is subject to the provisions of the Commonwealth of Virginia Vendors Manual and any changes or revisions thereto, which are hereby incorporated into this contract in their entirety. The procedure for filing contractual claims is in section 7.19 of the Vendors Manual. A copy of the manual is normally available for review at the purchasing office and is accessible on the Internet at www.eva.virginia.gov under "Vendors Manual" on the "Vendor" tab.

APP. LAWS AND COURTS

APPLICABLE LAWS AND COURTS: This solicitation and any resulting contract shall be governed in all respects by the laws of the Commonwealth of Virginia and any litigation with respect thereto shall be brought in the courts of the Commonwealth. The agency and the

contractor are encouraged to resolve any issues in controversy arising from the award of the contract or any contractual dispute using Alternative Dispute Resolution (ADR) procedures (Code of Virginia, § 2.2-4366). ADR procedures are described in Chapter 9 of the Vendors Manual. The contractor shall comply with all applicable federal, state and local laws, rules and regulations.

ANTI-DISCRIMINATION (1 of 2)

ANTI-DISCRIMINATION (part 1 of 2): By submitting their (bids/proposals), (bidders/offerors) certify to the Commonwealth that they will conform to the provisions of the Federal Civil Rights Act of 1964, as amended, as well as the Virginia Fair Employment Contracting Act of 1975, as amended, where applicable, the Virginians With Disabilities Act, the Americans With Disabilities Act and § 2.2-4311 of the Virginia Public Procurement Act (VPPA). If the award is made to a faith-based organization, the organization shall not discriminate against any recipient of goods, services, or disbursements made pursuant to the contract on the basis of the recipient's religion, religious belief, refusal to participate in a religious practice, or on the basis of race, age, color, gender or national origin and shall be subject to the same rules as other organizations that contract with public bodies to account for the use of the funds provided; however, if the faith-based organization segregates public funds into separate accounts, only the accounts and programs funded with public funds shall be subject to audit by the public body. (Code of Virginia, § 2.2-4343.1E). (continued on part 2)

ANTI-DISCRIMINATION (2 of 2)

ANTI-DISCRIMINATION (part 2 of 2): In every contract over \$10,000 the provisions in 1. and 2. below apply: 1.) During the performance of this contract, the contractor agrees as follows: (a.) The contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the contractor. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause. (b.) The contractor, in all solicitations or advertisements for employees placed by or on behalf of the contractor, will state that such contractor is an equal opportunity employer. (c.) Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting these requirements. 2.) The contractor will include the provisions of 1. above in every subcontract or purchase order over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

ETHICS IN PUBLIC CONTRACTING

ETHICS IN PUBLIC CONTRACTING: By submitting their (bids/proposals), (bidders/offerors) certify that their (bids/proposals) are made without collusion or fraud and that they have not offered or received any kickbacks or inducements from any other (bidder/offeror), supplier, manufacturer or subcontractor in connection with their (bid/proposal), and that they have not conferred on any public employee having official responsibility for this procurement transaction any payment, loan, subscription, advance, deposit of money, services or anything of more than nominal value, present or promised, unless consideration of substantially equal or greater value was exchanged.

IMMIGRATION REFORM

IMMIGRATION REFORM AND CONTROL ACT OF 1986: By entering into a written contract with the Commonwealth of Virginia, the Contractor certifies that the Contractor does not, and shall not during the performance of the contract for goods and services in the Commonwealth, knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

DEBARMENT STATUS

DEBARMENT STATUS: By submitting their (bids/proposals), (bidders/offerors) certify that they are not currently debarred by the Commonwealth of Virginia from submitting bids or proposals on contracts for the type of goods and/or services covered by this solicitation, nor are they an agent of any person or entity that is currently so debarred.

ANTITRUST

ANTITRUST: By entering into a contract, the contractor conveys, sells, assigns, and transfers to the Commonwealth of Virginia all rights, title and interest in and to all causes of action it may now have or hereafter acquire under the antitrust laws of the United States and the Commonwealth of Virginia, relating to the particular goods or services purchased or acquired by the Commonwealth of Virginia under said contract.

MANDATORY USE OF STATE FORM

MANDATORY USE OF STATE FORM AND TERMS AND CONDITIONS FOR IFB's:

Failure to submit a bid on the official state form provided for that purpose shall be a cause for rejection of the bid. Modification of or additions to any portion of the Invitation for Bids may be cause for rejection of the bid; however, the Commonwealth reserves the right to decide, on a case by case basis, in its sole discretion, whether to reject such a bid as nonresponsive. As a precondition to its acceptance, the Commonwealth may, in its sole discretion, request that the bidder withdraw or modify nonresponsive portions of a bid which do not affect quality, quantity, price, or delivery. No modification of or addition to the provisions of the contract shall be effective unless reduced to writing and signed by the parties.

CLARIFICATION OF TERMS

CLARIFICATION OF TERMS: If any prospective (bidder/offeror) has questions about the specifications or other solicitation documents, the prospective (bidder/offeror) should contact the buyer whose name appears on the face of the solicitation no later than five working days before the due date. Any revisions to the solicitation will be made only by addendum issued by the buyer.

PRECEDENCE OF TERMS

PRECEDENCE OF TERMS: The following General Terms and Conditions VENDORS MANUAL, APPLICABLE LAWS AND COURTS, ANTI-DISCRIMINATION, ETHICS IN PUBLIC CONTRACTING, IMMIGRATION REFORM AND CONTROL ACT OF 1986, DEBARMENT STATUS, ANTITRUST, MANDATORY USE OF STATE FORM AND TERMS AND CONDITIONS, CLARIFICATION OF TERMS, PAYMENT shall apply in all instances. In the event there is a conflict between any of the other General Terms and Conditions and any Special Terms and Conditions in this solicitation, the Special Terms and Conditions shall apply.

QUALIFICATIONS

QUALIFICATIONS OF (BIDDERS/OFFERORS): The Commonwealth may make such reasonable investigations as deemed proper and necessary to determine the ability of the (bidder/offeror) to perform the services/furnish the goods and the (bidder/offeror) shall furnish to the Commonwealth all such information and data for this purpose as may be requested. The Commonwealth reserves the right to inspect (bidder's/offeror's) physical facilities prior to award to satisfy questions regarding the (bidder's/offeror's) capabilities. The Commonwealth further reserves the right to reject any (bid/proposal) if the evidence submitted by, or investigations of, such (bidder/offeror) fails to satisfy the Commonwealth that such (bidder/offeror) is properly qualified to carry out the obligations of the contract and to provide the services and/or furnish the

goods contemplated therein.

TESTING AND INSPECTION

TESTING AND INSPECTION: The Commonwealth reserves the right to conduct any test/inspection it may deem advisable to assure goods and services conform to the specifications.

ASSIGNMENT OF CONTRACT

ASSIGNMENT OF CONTRACT: A contract shall not be assignable by the contractor in whole or in part without the written consent of the Commonwealth.

CHANGES TO CONTRACT (1 of 2)

CHANGES TO THE CONTRACT (part 1 of 2): Changes can be made to the contract in any of the following ways: (1.) The parties may agree in writing to modify the scope of the contract. An increase or decrease in the price of the contract resulting from such modification shall be agreed to by the parties as a part of their written agreement to modify the scope of the contract. (2.) The Purchasing Agency may order changes within the general scope of the contract at any time by written notice to the contractor. Changes within the scope of the contract include, but are not limited to, things such as services to be performed, the method of packing or shipment, and the place of delivery or installation. The contractor shall comply with the notice upon receipt. The contractor shall be compensated for any additional costs incurred as the result of such order and shall give the Purchasing Agency a credit for any savings. Said compensation shall be determined by one of the following methods: (2a.) By mutual agreement between the parties in writing; or (2b.) By agreeing upon a unit price or using a unit price set forth in the contract, if the work to be done can be expressed in units, and the contractor accounts for the number of units of work performed, subject to the Purchasing Agency's right to audit the contractor's records and/or to determine the correct number of units independently; or (continued on part 2)

CHANGES TO CONTRACT (2 of 2)

CHANGES TO THE CONTRACT (part 2 of 2): (2c.) By ordering the contractor to proceed with the work and keep a record of all costs incurred and savings realized. A markup for overhead and profit may be allowed if provided by the contract. The same markup shall be used for determining a decrease in price as the result of savings realized. The contractor shall present the Purchasing Agency with all vouchers and records of expenses incurred and savings realized. The

Purchasing Agency shall have the right to audit the records of the contractor as it deems necessary to determine costs or savings. Any claim for an adjustment in price under this provision must be asserted by written notice to the Purchasing Agency within thirty (30) days from the date of receipt of the written order from the Purchasing Agency. If the parties fail to agree on an amount of adjustment, the question of an increase or decrease in the contract price or time for performance shall be resolved in accordance with the procedures for resolving disputes provided by the Disputes Clause of this contract or, if there is none, in accordance with the disputes provisions of the Commonwealth of Virginia Vendors Manual. Neither the existence of a claim nor a dispute resolution process, litigation or any other provision of this contract shall excuse the contractor from promptly complying with the changes ordered by the Purchasing Agency or with the performance of the contract generally.

DEFAULT

DEFAULT: In case of failure to deliver goods or services in accordance with the contract terms and conditions, the Commonwealth, after due oral or written notice, may procure them from other sources and hold the contractor responsible for any resulting additional purchase and administrative costs. This remedy shall be in addition to any other remedies which the Commonwealth may have.

TAXES

TAXES: Sales to the Commonwealth of Virginia are normally exempt from State sales tax. State sales and use tax certificates of exemption, Form ST-12, will be issued upon request. Deliveries against this contract shall usually be free of Federal excise and transportation taxes. The Commonwealth's excise tax exemption registration number is 54-73-0076K.

USE OF BRAND NAMES

USE OF BRAND NAMES: Unless otherwise provided in this solicitation, the name of a certain brand, make or manufacturer does not restrict (bidders/offerors) to the specific brand, make or manufacturer named, but conveys the general style, type, character, and quality of the article desired. Any article which the public body, in its sole discretion, determines to be the equivalent of that specified, considering quality, workmanship, economy of operation, and suitability for the purpose intended, shall be accepted. The (bidder/offeror) is responsible to clearly and specifically identify the product being offered and to provide sufficient descriptive literature, catalog cuts and technical detail to enable the Commonwealth to determine if the product offered meets the requirements of the solicitation. This is required even if offering the exact brand, make or manufacturer specified. Normally in competitive sealed bidding only the information

furnished with the bid will be considered in the evaluation. Failure to furnish adequate data for evaluation purposes may result in declaring a bid nonresponsive. Unless the (bidder/offeror) clearly indicates in its (bid/proposal) that the product offered is an equivalent product, such (bid/proposal) will be considered to offer the brand name product referenced in the solicitation.

TRANSPORTATION AND PACKAGING

TRANSPORTATION AND PACKAGING: By submitting their (bids/proposals), all (bidders/offerors) certify and warrant that the price offered for FOB destination includes only the actual freight rate costs at the lowest and best rate and is based upon the actual weight of the goods to be shipped. Except as otherwise specified herein, standard commercial packaging, packing and shipping containers shall be used. All shipping containers shall be legibly marked or labeled on the outside with purchase order number, commodity description, and quantity.

INSURANCE (1 of 3)

INSURANCE (part 1 of 3): By signing and submitting a bid or proposal under this solicitation, the bidder or offeror certifies that if awarded the contract, it will have the following insurance coverage at the time the contract is awarded. For construction contracts, if any subcontractors are involved, the subcontractor will have workers' compensation insurance in accordance with §§ 2.2-4332 and 65.2-800 et seq. of the Code of Virginia. The bidder or offeror further certifies that the contractor and any subcontractors will maintain these insurance coverage during the entire term of the contract and that all insurance coverage will be provided by insurance companies authorized to sell insurance in Virginia by the Virginia State Corporation Commission.
(continued in part 2)

INSURANCE (2 of 3)

INSURANCE (part 2 of 3) MINIMUM INSURANCE COVERAGES AND LIMITS REQUIRED FOR MOST CONTRACTS: 1) Workers' Compensation - Statutory requirements and benefits. Coverage is compulsory for employers of three or more employees, to include the employer. Contractors who fail to notify the Commonwealth of increases in the number of employees that change their workers' compensation requirements under the Code of Virginia during the course of the contract shall be in noncompliance with the contract. 2). Employer's Liability - \$100,000. 3) Commercial General Liability - \$1,000,000 per occurrence. Commercial General Liability is to include bodily injury and property damage, personal injury and advertising injury, products and completed operations coverage. The Commonwealth of Virginia must be named as an additional insured and so endorsed on the policy 4). Automobile Liability - \$1,000,000 per occurrence. (Only used if motor vehicle is to be used in the contract.). (continued

in part 3)

INSURANCE (3 of 3)

INSURANCE (part 3 of 3): NOTE: In addition, various Professional Liability/Errors and Omissions coverage are required when soliciting those services as follows: Profession/Service /Limits, Accounting /\$1,000,000 per occurrence, \$3,000,000 aggregate Architecture/\$2,000,000 per occurrence, \$6,000,000 aggregate, Asbestos Design, Inspection or Abatement Contractors/ \$1,000,000 per occurrence, \$3,000,000 aggregate, Health Care Practitioner (to include Dentists, Licensed Dental, Hygienists, Optometrists, Registered or Licensed, Practical Nurses, Pharmacists, Physicians, Podiatrists, Chiropractors, Physical Therapists, Physical ,Therapist Assistants, Clinical Psychologists, Clinical Social Workers, Professional Counselors, Hospitals, or Health Maintenance Organizations.) \$1,750,000 per occurrence, \$3,000,000 aggregate, (Limits increase each July 1 through fiscal year 2008, as follows: July 1, 2005 - \$1,800,000, July 1, 2006 - \$1,850,000, July 1, 2007 - \$1,925,000, July 1, 2008 - \$2,000,000. This complies with §8.01-581.15 of the Code of Virginia. Insurance/Risk Management /\$1,000,000 per occurrence, \$3,000,000 aggregate, Landscape/Architecture/\$1,000,000 per occurrence, \$1,000,000 aggregate, Legal/\$1,000,000 per occurrence, \$5,000,000 aggregate. Professional Engineer/\$2,000,000 per occurrence, \$6,000,000 aggregate, Surveying/\$1,000,000 per occurrence, \$1,000,000 aggregate

ANNOUNCEMENT OF AWARD

ANNOUNCEMENT OF AWARD: Upon the award or the announcement of the decision to award a contract over \$50,000, as a result of this solicitation, the purchasing agency will publicly post such notice on the DGS/DPS eVA website (www.eva.virginia.gov) for a minimum of 10 days.

DRUG-FREE WORKPLACE

DRUG-FREE WORKPLACE: During the performance of this contract, the contractor agrees to (i) provide a drug-free workplace for the contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon

each subcontractor or vendor. For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

NONDISCRIMINATION

NONDISCRIMINATION OF CONTRACTORS: A bidder, offeror, or contractor shall not be discriminated against in the solicitation or award of this contract because of race, religion, color, sex, national origin, age, disability, faith-based organizational status, any other basis prohibited by state law relating to discrimination in employment or because the bidder or offeror employs ex-offenders unless the state agency, department or institution has made a written determination that employing ex-offenders on the specific contract is not in its best interest. If the award of this contract is made to a faith-based organization and an individual, who applies for or receives goods, services, or disbursements provided pursuant to this contract objects to the religious character of the faith-based organization from which the individual receives or would receive the goods, services, or disbursements, the public body shall offer the individual, within a reasonable period of time after the date of his objection, access to equivalent goods, services, or disbursements from an alternative provider.

AVAILABILITY OF FUNDS

It is understood and agreed between the parties herein that the agency shall be bound hereunder only to the extent of the funds available or which may hereafter become available for the purpose of this agreement.

SET ASIDES

This solicitation is set-aside for DMBE-certified small business participation only when designated "SET-ASIDE FOR SMALL BUSINESSES" in the solicitation. DMBE-certified small businesses are those businesses that hold current small business certification from the Virginia Department of Minority Business Enterprise. This shall not exclude DMBE-certified women-owned and minority-owned businesses when they have received the DMBE small business certification. For purposes of award, bidders/offerors shall be deemed small businesses if and only if they are certified as such by DMBE on the due date for receipt of bids/proposals.

PAYMENT (1 of 4)

PAYMENT (part 1 of 4): To Prime Contractor: a.) Invoices for items ordered, delivered and accepted shall be submitted by the contractor directly to the payment address shown on the purchase order/contract. All invoices shall show the state contract number and/or purchase order number; social security number (for individual contractors) or the federal employer identification number (for proprietorships, partnerships, and corporations). b.) Any payment terms requiring payment in less than 30 days will be regarded as requiring payment 30 days after invoice or delivery, whichever occurs last. This shall not affect offers of discounts for payment in less than 30 days, however. c.) All goods or services provided under this contract or purchase order, that are to be paid for with public funds, shall be billed by the contractor at the contract price, regardless of which public agency is being billed. d.) The following shall be deemed to be the date of payment: the date of postmark in all cases where payment is made by mail, or the date of offset when offset proceedings have been instituted as authorized under the Virginia Debt Collection Act. e.) Unreasonable Charges. Under certain emergency procurements and for most time and material purchases, final job costs cannot be accurately determined at the time orders are placed.(Continued on part 2)

PAYMENT (2 of 4)

PAYMENT (part 2 of 4): In such cases, contractors should be put on notice that final payment in full is contingent on a determination of reasonableness with respect to all invoiced charges. Charges which appear to be unreasonable will be researched and challenged, and that portion of the invoice held in abeyance until a settlement can be reached. Upon determining that invoiced charges are not reasonable, the Commonwealth shall promptly notify the contractor, in writing, as to those charges which it considers unreasonable and the basis for the determination. A contractor may not institute legal action unless a settlement cannot be reached within thirty (30) days of notification. The provisions of this section do not relieve an agency of its prompt payment obligations with respect to those charges which are not in dispute (Code of Virginia, § 2.2-4363). 2. To Subcontractors: a.) A contractor awarded a contract under this solicitation is hereby obligated: (1) To pay the subcontractor(s) within seven (7) days of the contractor's receipt of payment from the Commonwealth for the proportionate share of the payment received for work performed by the subcontractor(s) under the contract; or (2) To notify the agency and the subcontractor(s), in writing, of the contractor's intention to withhold payment and the reason. (continued on part 3)

PAYMENT (3 of 4)

PAYMENT (part 3 of 4): b.) The contractor is obligated to pay the subcontractor(s) interest at the rate of one percent per month (unless otherwise provided under the terms of the contract) on all amounts owed by the contractor that remain unpaid seven (7) days following receipt of

payment from the Commonwealth, except for amounts withheld as stated in (2) above. The date of mailing of any payment by U. S. Mail is deemed to be payment to the addressee. These provisions apply to each sub-tier contractor performing under the primary contract. A contractor's obligation to pay an interest charge to a subcontractor may not be construed to be an obligation of the Commonwealth. 3.) Each prime contractor who wins an award in which provision of a SWAM procurement plan is a condition to the award, shall deliver to the contracting agency or institution, on or before request for final payment, evidence and certification of compliance (subject only to insubstantial shortfalls and to shortfalls arising from subcontractor default) with the SWAM procurement plan. Final payment under the contract in question may be withheld until such certification is delivered and, if necessary, confirmed by the agency or institution, or other appropriate penalties may be assessed in lieu of withholding such payment.

PAYMENT (4 of 4)

PAYMENT (part 4 of 4): The Commonwealth of Virginia encourages contractors and subcontractors to accept electronic and credit card payments.

eVA REGISTRATION (1 of 2)

eVA BUSINESS-TO-GOVERNMENT VENDOR REGISTRATION (part 1 of 2): The eVA Internet electronic procurement solution, web site portal www.eVA.virginia.gov streamlines and automates government purchasing activities in the Commonwealth. The eVA portal is the gateway for vendors to conduct business with state agencies and public bodies. All vendors desiring to provide goods and/or services to the Commonwealth shall participate in the eVA Internet e-procurement solution either through the eVA Basic Vendor Registration Service or eVA Premium Vendor Registration Service. All bidders or offerors must register in eVA; failure to register will result in the bid/proposal being rejected. (Continued on part 2)

eVA REGISTRATION (2 of 2)

eVA BUSINESS-TO-GOVERNMENT VENDOR REGISTRATION (part 2 of 2): a. eVA Basic Vendor Registration Service: \$25 Annual Registration Fee plus the appropriate order Transaction Fee specified below. eVA Basic Vendor Registration Service includes electronic order receipt, vendor catalog posting, on-line registration, electronic bidding, and the ability to research historical procurement data available in the eVA purchase transaction data warehouse. b. eVA Premium Vendor Registration Service: \$25 Annual Registration Fee plus the appropriate order Transaction Fee specified below. eVA Premium Vendor Registration Service includes all benefits of the eVA Basic Vendor Registration Service plus automatic email or fax notification

of solicitations and amendments. c. For orders issued prior to August 16, 2006, the Vendor Transaction Fee is 1%, capped at a maximum of \$500 per order. d. For orders issued August 16, 2006 and after, the Vendor Transaction Fee is: (i)DMBE-certified Small Businesses: 1%, capped at \$500 per order. (ii)Businesses that are not DMBE-certified Small Businesses: 1%, capped at \$1,500 per order. The eVA transaction fee will be invoiced approximately 30 days after the corresponding purchase order is issued and payable 30 days after the invoice date. Any adjustments (increases/decreases) will be handled through purchase order changes.

BID PRICE CURRENCY:

BID PRICE CURRENCY: Unless stated otherwise in the solicitation, bidders/offerors shall state bid/offer prices in US dollars.

BUSINESS AUTHORIZATION

AUTHORIZATION TO CONDUCT BUSINESS IN THE COMMONWEALTH: A contractor organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership shall be authorized to transact business in the Commonwealth as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the Code of Virginia or as otherwise required by law. Any business entity described above that enters into a contract with a public body pursuant to the Virginia Public Procurement Act shall not allow its existence to lapse or its certificate of authority or registration to transact business in the Commonwealth, if so required under Title 13.1 or Title 50, to be revoked or cancelled at any time during the term of the contract. A public body may void any contract with a business entity if the business entity fails to remain in compliance with the provisions of this section.

End of General Terms and Conditions