1. Solicitation #: AC0029 Transit Buses / OMPT
2. Solicitation Issue Date: 8/27/2021

3. Brief Description of Requirement:

Transit Bus Solicitation
Questions may be submitted until 12:00 PM (noon) Friday, September 3, 2021 with responses made available no later than 3:00 PM, Wednesday, September 8, 2021 and are to be emailed to lbybee@odot.org.

The solicitation is let pursuant to 74 OS § 85.3A(8).

As of 03/18/2020 and until further notice, due to concerns about the possible spread of the coronavirus on packages, bids should be submitted to ODOT via email LBYBEE@ODOT.ORG. Electronic bids will still be considered sealed bids and the attachments will not be opened until bid closing. Electronic bids should be emailed to the Buyer handling the solicitation.

4. Response Due Date¹: 9/15/2021 Time: 3:00 PM CST/CDT

5. Issued By and RETURN SEALED BID TO²:

U.S. Postal Delivery Address: ____________________________

Common Carrier Delivery Address: ____________________________

Electronic Submission Address: LBYBEE@ODOT.ORG

6. Solicitation Type (type “X” at one below):

☐ Invitation to Bid
☒ Request for Proposal
☐ Request for Quote

7. Contracting Officer:

Name: Laura Bybee
Phone: (405) 628-4034
Email: lbybee@odot.org

¹ Amendments to solicitation may change the Response Due Date (read GENERAL PROVISIONS, section 3, “Solicitation Amendments”).
² If “U.S. Postal Delivery” differs from “Carrier Delivery, use “Carrier Delivery” for courier or personal deliveries.
Responding Bidder Information

“Certification for Competitive Bid and Contract” **MUST** be submitted along with the response to the Solicitation.

1. **RE: Solicitation #** AC0029 / OMPT

2. **Bidder General Information:**
   - FEI / SSN: ____________________________  Supplier ID: ____________________________
   - Company Name: ____________________________

3. **Bidder Contact Information:**
   - Address: ____________________________
   - City: ____________________  State: ___  Zip Code: ______________
   - Contact Name: ____________________________
   - Contact Title: ____________________________
   - Phone #: ____________________  Fax #: ____________________
   - Email: ____________________________  Website: ____________________________

4. **Oklahoma Sales Tax Permit**:  
   - [ ] YES – Permit #: __________________
   - [ ] NO – Exempt pursuant to Oklahoma Laws or Rules – Attach an explanation of exemption

5. **Registration with the Oklahoma Secretary of State**:  
   - [ ] YES - Filing Number: ____________________________
   - [ ] NO - Prior to the contract award, the successful bidder will be required to register with the Secretary of State or must attach a signed statement that provides specific details supporting the exemption the supplier is claiming (www.sos.ok.gov or 405-521-3911).

6. **Workers’ Compensation Insurance Coverage**:  
   - Bidder is required to provide with the bid a certificate of insurance showing proof of compliance with the Oklahoma Workers’ Compensation Act.
   - [ ] YES – Include with the bid a certificate of insurance.
   - [ ] NO – Exempt from the Workers’ Compensation Act pursuant to 85A O.S. § 2(18)(b)(1-11) – Attach a written, signed, and dated statement on letterhead stating the reason for the exempt status.

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3 For frequently asked questions concerning Oklahoma Sales Tax Permit, see [https://www.ok.gov/tax/Businesses/index.html](https://www.ok.gov/tax/Businesses/index.html)

4 For frequently asked questions concerning workers’ compensation insurance, see [https://www.ok.gov/wcc/Insurance/index.html](https://www.ok.gov/wcc/Insurance/index.html)
7. Disabled Veteran Business Enterprise Act

☐ YES – I am a service-disabled veteran business as defined in 74 O.S. §85.44E. Include with the bid response 1) certification of service-disabled veteran status as verified by the appropriate federal agency, and 2) verification of not less than 51% ownership by one or more service-disabled veterans, and 3) verification of the control of the management and daily business operations by one or more service-disabled veterans.

☐ NO – Do not meet the criteria as a service-disabled veteran business.

_________________________________________  ______________________________________
Authorized Signature                          Date

_________________________________________  ______________________________________
Printed Name                                  Title
NOTE: A certification shall be included with any competitive bid and/or contract exceeding $5,000.00 submitted to the State for goods or services.

<table>
<thead>
<tr>
<th>Agency Name:</th>
<th>Oklahoma Department of Transportation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agency Number:</td>
<td>34500</td>
</tr>
<tr>
<td>Solicitation or Purchase Order #:</td>
<td>AC0029 / OMPT</td>
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<tr>
<td>Supplier Legal Name:</td>
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SECTION I [74 O.S. § 85.22]:
A. For purposes of competitive bid,
1. I am the duly authorized agent of the above named bidder submitting the competitive bid herewith, for the purpose of certifying the facts pertaining to the existence of collusion among bidders and between bidders and state officials or employees, as well as facts pertaining to the giving or offering of things of value to government personnel in return for special consideration in the letting of any contract pursuant to said bid;
2. I am fully aware of the facts and circumstances surrounding the making of the bid to which this statement is attached and have been personally and directly involved in the proceedings leading to the submission of such bid; and
3. Neither the bidder nor anyone subject to the bidder's direction or control has been a party:
   a. to any collusion among bidders in restraint of freedom of competition by agreement to bid at a fixed price or to refrain from bidding,
   b. to any collusion with any state official or employee as to quantity, quality or price in the prospective contract, or as to any other terms of such prospective contract, nor
   c. in any discussions between bidders and any state official concerning exchange of money or other thing of value for special consideration in the letting of a contract, nor
   d. to any collusion with any state agency or political subdivision official or employee as to create a sole-source acquisition in contradiction to Section 85.45j.1. of this title.
B. I certify, if awarded the contract, whether competitively bid or not, neither the contractor nor anyone subject to the contractor's direction or control has paid, given or donated or agreed to pay, give or donate to any officer or employee of the State of Oklahoma any money or other thing of value, either directly or indirectly, in procuring this contract herein.

SECTION II [74 O.S. § 85.42]:
For the purpose of a contract for services, the supplier also certifies that no person who has been involved in any manner in the development of this contract while employed by the State of Oklahoma shall be employed by the supplier to fulfill any of the services provided for under said contract.

The undersigned, duly authorized agent for the above named supplier, by signing below acknowledges this certification statement is executed for the purposes of:

- [ ] the competitive bid attached herewith and contract, if awarded to said supplier;
- [X] OR
- [ ] the contract attached herewith, which was not competitively bid and awarded by the agency pursuant to applicable Oklahoma statutes.

<table>
<thead>
<tr>
<th>Supplier Authorized Signature</th>
<th>Certified This Date</th>
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<tbody>
<tr>
<td>Printed Name</td>
<td>Title</td>
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<tr>
<td>Phone Number</td>
<td>Email</td>
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<td>H. PRICE AND COST</td>
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A. GENERAL PROVISIONS

A.1. Definitions

As used herein, the following terms shall have the following meaning unless the context clearly indicates otherwise:

A.1.1. "Acquisition" means items, products, materials, supplies, services, and equipment an entity acquires by purchase, lease purchase, lease with option to purchase, or rental;

A.1.2. "Addendum" means a written restatement of or modification to a Contract Document executed by the Supplier and State.

A.1.3. "Bid" means an offer in the form of a bid, proposal, or quote a bidder submits in response to a solicitation;

A.1.4. "Bidder" means an individual or business entity that submits a bid in response to a solicitation;

A.1.5. "Solicitation" means a request or invitation by the State Purchasing Director or a state agency for a supplier to submit a priced offer to sell acquisitions to the state. A solicitation may be an invitation to bid, request for proposal, or a request for quotation; and

A.1.6. "Supplier" or "vendor" means an individual or business entity that sells or desires to sell acquisitions to state agencies.

A.2. Bid Submission

A.2.1. Submitted bids shall be in strict conformity with the instructions to bidders and shall be submitted with a completed Responding Bidder Information, included with this packet, and any other forms required by the solicitation.

A.2.2. Bids shall be submitted to the procuring agency electronically via email to the buyer listed in this solicitation. This will still remain a sealed bid and no attachments will be opened until bid closing.

A.2.3. The required certification statement, "Certification for Competitive Bid and/or Contract (Non-Collusion Certification)", included with this packet, must be made out in the name of the bidder and must be properly executed by an authorized person, with full knowledge and acceptance of all its provisions.

A.2.4. All bids shall be legible and completed in ink or with electronic printer or other similar office equipment. Any corrections to bids shall be identified and initialed in ink by the bidder. Penciled bids and penciled corrections shall NOT be accepted and will be rejected as non-responsive. The bidder is required to submit an electronic copy.

A.2.5. All bids submitted shall be subject to the Oklahoma Central Purchasing Act, Central Purchasing Rules, and other statutory regulations as applicable, these General Provisions, any Special Provisions, solicitation specifications, required certification statement, and all other terms and conditions listed or attached herein—all of which are made part of this solicitation.

A.3. Solicitation Amendments

A.3.1. If an "Amendment of Solicitation", if included later with this packet, is issued, the bidder shall acknowledge receipt of any/all amendment(s) to solicitations by signing and returning the solicitation amendment(s). Amendment acknowledgement(s) may be submitted with the bid or may be forwarded separately. If forwarded separately, amendment acknowledgement(s) must contain the solicitation number and response due date and time on the front of the envelope. The procuring agency must receive the amendment acknowledgement(s) by the response due date and time specified for receipt of bids for the bid to be deemed responsive. Failure to acknowledge solicitation amendments may be grounds for rejection.

A.3.2. No oral statement of any person shall modify or otherwise affect the terms, conditions, or specifications stated in the solicitation. All amendments to the solicitation shall be made in writing by the procuring agency.

A.3.3. It is the bidder's responsibility to check frequently for any possible amendments that may be issued. The procuring agency is not responsible for a bidder's failure to download any amendment documents required to complete a solicitation.

A.4. Bid Change

If the bidder needs to change a bid prior to the solicitation response due date, a new bid shall be submitted to the procuring agency with the following statement "This bid supersedes the bid previously submitted."

A.5. Certification Regarding Debarment, Suspension, and Other Responsibility Matters

By submitting a response to this solicitation:
A.5.1. The prospective primary participant and any subcontractor certifies to the best of their knowledge and belief, that they and their principals or participants:

A.5.1.1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal, State or local department or agency;

A.5.1.2. Have not within a three-year period preceding this proposal been convicted of or pled guilty or had 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) contract; or for 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;

A.5.1.3. Are not presently indicted 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 A.5.1.2. of this certification; and

A.5.1.4. Have not within a three-year period preceding this application/proposal had one or more public (Federal, State, or local) contracts terminated for cause or default.

A.5.2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to its solicitation response.

A.6. Bid Opening

Sealed bids shall be opened by the Oklahoma Dept. of Transportation, located at 200 N.E. 21st Street, Oklahoma City, OK 73105 at the time and date specified in the solicitation as the Response Due Date and Time.

A.7. Open Bid / Open Record

Pursuant to the Oklahoma Public Open Records Act, a public bid opening does not make the bid(s) immediately accessible to the public. The procurement or contracting agency shall keep the bid(s) confidential, and provide prompt and reasonable access to the records only after a contract is awarded or the solicitation is cancelled. This practice protects the integrity of the competitive bid process and prevents excessive disruption to the procurement process. The interest of achieving the best value for the State of Oklahoma outweighs the interest of vendors immediately knowing the contents of competitor’s bids. [51 O.S. § 24A.5 (5)]

Additionally, financial or proprietary information submitted by a bidder may be designated by the Procurement Division Manager as confidential and the procurement entity may reject all requests to disclose information designated as confidential pursuant to 62 O.S. (2012) § 34.11.1(H)(2) and 74 O.S. (2011) § 85.10. Bidders claiming any portion of their bid as proprietary or confidential must specifically identify what documents or portions of documents they consider confidential and identify applicable law supporting their claim of confidentiality. The ODOT General Counsel shall make the final decision as to whether the documentation or information is confidential pursuant to 74 O.S. § 85.10. Otherwise, documents and information a bidder submits as part of or in connection with a bid are public records and subject to disclosure after contract award or the solicitation is cancelled.

A.8. Late Bids

Bids received by the procuring agency after the response due date and time shall be deemed non-responsive and shall NOT be considered for any resultant award.

A.9. Legal Contract

A.9.1. Submitted bids are rendered as a legal offer and any bid, when accepted by the procuring agency, shall constitute a contract.

A.9.2. The Contract resulting from this solicitation may consist of the following documents in the following order of precedence:

A.9.2.1. Any Addendum to the Contract;

A.9.2.2. Purchase order, as amended by Change Order (if applicable);

A.9.2.3. Solicitation, as amended (if applicable); and

A.9.2.4. Successful bid (including required certifications), to the extent the bid does not conflict with the requirements of the solicitation or applicable law.

A.9.3. Any contract(s) awarded pursuant to the solicitation shall be legibly written or typed.
A.10.  Pricing

A.10.1. Bids shall remain firm for a minimum of sixty (60) days from the solicitation closing date.

A.10.2. Bidders guarantee unit prices to be correct.

A.10.3. In accordance with 74 O.S. §85.40, ALL travel expenses to be incurred by the supplier in performance of the Contract shall be included in the total bid price/contract amount.

A.11.  Manufacturers' Name and Approved Equivalents

Unless otherwise specified in the solicitation, manufacturers' names, brand names, information and/or catalog numbers listed in a specification are for information and not intended to limit competition. Bidder may offer any brand for which they are an authorized representative, and which meets or exceeds the specification for any item(s). However, if bids are based on equivalent products, indicate on the bid form the manufacturer's name and number. Bidder shall submit sketches, descriptive literature, and/or complete specifications with their bid. Reference to literature submitted with a previous bid will not satisfy this provision. The bidder shall also explain in detail the reason(s) why the proposed equivalent will meet the specifications and not be considered an exception thereto. Bids that do not comply with these requirements are subject to rejection.

A.12.  Clarification of Solicitation

A.12.1. Clarification pertaining to the contents of this solicitation shall be directed in writing to the Contracting Officer specified in the solicitation, and must be prior to the closing date of the solicitation.

A.12.2. If a bidder fails to notify the State of an error, ambiguity, conflict, discrepancy, omission or other error in the SOLICITATION, known to the bidder, or that reasonably should have been known by the bidder, the bidder shall submit a bid at its own risk; and if awarded the contract, the bidder shall not be entitled to additional compensation, relief, or time, by reason of the error or its later correction. If a bidder takes exception to any requirement or specification contained in the SOLICITATION, these exceptions must be clearly and prominently stated in their response.

A.12.3. Bidders who believe proposal requirements or specifications are unnecessarily restrictive or limit competition may submit a written request for administrative review to the contracting officer listed on the solicitation. This request must be made prior to the closing date of the solicitation.

A.13. Negotiations

A.13.1. In accordance with Title 74 §85.5, the State of Oklahoma reserves the right to negotiate with one, selected, all or none of the vendors responding to this solicitation to obtain the best value for the State. Negotiations could entail discussions on products, services, pricing, contract terminology or any other issue that may mitigate the State’s risks. The State shall consider all issues negotiable and not artificially constrained by internal corporate policies. Negotiation may be with one or more vendors, for any and all items in the vendor’s offer.

A.13.2. Firms that contend that they lack flexibility because of their corporate policy on a particular negotiation item shall face a significant disadvantage and may not be considered. If such negotiations are conducted, the following conditions shall apply:

A.13.3. Negotiations may be conducted in person, in writing, or by telephone.

A.13.4. Negotiations shall only be conducted with potentially acceptable offers. The State reserves the right to limit negotiations to those offers that received the highest rankings during the initial evaluation phase.

A.13.5. Terms, conditions, prices, methodology, or other features of the bidders offer may be subject to negotiations and subsequent revision. As part of the negotiations, the bidder may be required to submit supporting financial, pricing, and other data in order to allow a detailed evaluation of the feasibility, reasonableness, and acceptability of the offer.

A.13.6. The requirements of the Request for Proposal shall not be negotiable and shall remain unchanged unless the State determines that a change in such requirements is in the best interest of the State Of Oklahoma.

A.14. Rejection of Bid

The State reserves the right to reject any bids that do not comply with the requirements and specifications of the solicitation. A bid may be rejected when the bidder imposes terms or conditions that would modify requirements of the solicitation or limit the bidder’s liability to the State. Other possible reasons for rejection of bids are listed in OAC 260:115-7-32.
A.15. **Award of Contract**

A.15.1. The Procurement Division Manager may award the Contract to more than one bidder by awarding the Contract(s) by item or groups of items, or may award the Contract on an ALL OR NONE basis, whichever is deemed by the Procurement Division Manager to be in the best interest of the State of Oklahoma.

A.15.2. Contract awards will be made to the lowest and best bidder(s) unless the solicitation specifies that best value criteria is being used.

A.15.3. In order to receive an award or payments from the State of Oklahoma, suppliers must be registered. The vendor registration process can be completed electronically through the OMES website at the following link: [https://www.ok.gov/dcs/vendors/index.php](https://www.ok.gov/dcs/vendors/index.php).

A.16. **Contract Modification**

A.16.1. The Contract is issued under the authority of the Procurement Division Manager who signs the Contract. The Contract may be modified only through a written Addendum, signed by the ODOT and the supplier.

A.16.2. Any change to the Contract, including but not limited to the addition of work or materials, the revision of payment terms, or the substitution of work or materials, directed by a person who is not specifically authorized by the procuring agency in writing, or made unilaterally by the supplier, is a breach of the Contract. Unless otherwise specified by applicable law or rules, such changes, including unauthorized written Addendums, shall be void and without effect, and the supplier shall not be entitled to any claim under this Contract based on those changes. No oral statement of any person shall modify or otherwise affect the terms, conditions, or specifications stated in the resultant Contract.

A.17. **Delivery, Inspection and Acceptance**

A.17.1. Unless otherwise specified in the solicitation or awarding documents, all deliveries shall be F.O.B. Destination. The supplier(s) awarded the Contract shall prepay all packaging, handling, shipping and delivery charges and firm prices quoted in the bid shall include all such charges. All products and/or services to be delivered pursuant to the Contract shall be subject to final inspection and acceptance by the State at destination. "Destination" shall mean delivered to the receiving dock or other point specified in the purchase order. The State assumes no responsibility for goods until accepted by the State at the receiving point in good condition. Title and risk of loss or damage to all items shall be the responsibility of the supplier until accepted by the receiving agency. The supplier(s) awarded the Contract shall be responsible for filing, processing, and collecting any and all damage claims accruing prior to acceptance.

A.17.2. Supplier(s) awarded the Contract shall be required to deliver products and services as bid on or before the required date. Deviations, substitutions or changes in products and services shall not be made unless expressly authorized in writing by the procuring agency.

A.18. **Invoicing and Payment**

A.18.1. Upon submission of an accurate and proper invoice, the invoice shall be paid in arrears after products have been delivered or services provided and in accordance with applicable law. Invoices shall contain the purchase order number, a description of the products delivered or services provided, and the dates of such delivery or provision of services. An invoice is considered proper if sent to the proper recipient and goods or services have been received.

A.18.2. State Acquisitions are exempt from sales taxes and federal excise taxes.

A.18.3. Pursuant to 74 O.S. §85.44(B), invoices will be paid in arrears after products have been delivered or services provided.

A.18.4. Payment terms will be net 45. Interest on late payments made by the State of Oklahoma is governed by 62 O.S. § 34.72.

A.18.5. Additional terms which provide discounts for earlier payment may be evaluated when making an award. Any such additional terms shall be no less than ten (10) days increasing in five (5) day increments up to thirty (30) days. The date from which the discount time is calculated shall be the date of a proper invoice.

A.19. **Tax Exemption**

State agency acquisitions are exempt from sales taxes and federal excise taxes. Bidders shall not include these taxes in price quotes.
A.20. Audit and Records Clause

A.20.1. As used in this clause, "records" includes books, documents, accounting procedures and practices, and other data, regardless of type and regardless of whether such items are in written form, in the form of computer data, or in any other form. In accepting any Contract with the State, the successful bidder(s) agree any pertinent State or Federal agency will have the right to examine and audit all records relevant to execution and performance of the resultant Contract.

A.20.2. The successful supplier(s) awarded the Contract(s) is required to retain records relative to the Contract for the duration of the Contract and for a period of seven (7) years following completion and/or termination of the Contract. If an audit, litigation, or other action involving such records is started before the end of the seven (7) year period, the records are required to be maintained for two (2) years from the date that all issues arising out of the action are resolved, or until the end of the seven (7) year retention period, whichever is later.

A.21. Non-Appropriation Clause

The terms of any Contract resulting from the solicitation and any Purchase Order issued for multiple years under the Contract are contingent upon sufficient appropriations being made by the Legislature or other appropriate government entity. Notwithstanding any language to the contrary in the solicitation, purchase order, or any other Contract document, the procuring agency may terminate its obligations under the Contract if sufficient appropriations are not made by the Legislature or other appropriate governing entity to pay amounts due for multiple year agreements. The Requesting (procuring) Agency's decisions as to whether sufficient appropriations are available shall be accepted by the supplier and shall be final and binding.

A.22. Choice of Law

Any claims, disputes, or litigation relating to the solicitation, or the execution, interpretation, performance, or enforcement of the Contract shall be governed by the laws of the State of Oklahoma.

A.23. Choice of Venue

Venue for any action, claim, dispute or litigation relating in any way to the Contract shall be in Oklahoma County, Oklahoma.

A.24. Termination for Cause

A.24.1. The supplier may terminate the Contract for default or other just cause with a 30-day written request and upon written approval from the procuring agency. The State may terminate the Contract for default or any other just cause upon a 30-day written notification to the supplier.

A.24.2. The State may terminate the Contract immediately, without a 30-day written notice to the supplier, when violations are found to be an impediment to the function of an agency and detrimental to its cause, when conditions preclude the 30-day notice, or when the Procurement Division Manager determines that an administrative error occurred prior to Contract performance.

A.24.3. If the Contract is terminated, the State shall be liable only for payment for products and/or services delivered and accepted.

A.25. Termination for Convenience

A.25.1. The State may terminate the Contract, in whole or in part, for convenience if the Procurement Division Manager determines that termination is in the State's best interest. The Procurement Division Manager shall terminate the contract by delivering to the supplier a Notice of Termination for Convenience specifying the terms and effective date of Contract termination. The Contract termination date shall be a minimum of 60 days from the date the Notice of Termination for Convenience is issued by the Procurement Division Manager.

A.25.2. If the Contract is terminated, the State shall be liable only for products and/or services delivered and accepted, and for costs and expenses (exclusive of profit) reasonably incurred prior to the date upon which the Notice of Termination for Convenience was received by the supplier.

A.26. Insurance

The successful supplier(s) awarded the Contract shall obtain and retain insurance, including workers' compensation, automobile insurance, medical malpractice, and general liability, as applicable, or as required by State or Federal law, prior to commencement of any work in connection with the Contract. The supplier awarded the Contract shall timely renew the policies to be carried pursuant to this section throughout the term of the Contract and shall provide the procuring agency with evidence of such insurance and renewals.
A.27. **Employment Relationship**

The Contract does not create an employment relationship. Individuals performing services required by this Contract are not employees of the State of Oklahoma or the procuring agency. The supplier’s employees shall not be considered employees of the State of Oklahoma nor of the procuring agency for any purpose, and accordingly shall not be eligible for rights or benefits accruing to state employees.

A.28. **Compliance with the Oklahoma Taxpayer and Citizen Protection Act of 2007**

By submitting a bid for services, the bidder certifies that they, and any proposed subcontractors, are in compliance with 25 O.S. §1313 and participate in the Status Verification System. The Status Verification System is defined in 25 O.S. §1312 and includes but is not limited to the free Employment Verification Program (E-Verify) through the Department of Homeland Security and available at [www.dhs.gov/E-Verify](http://www.dhs.gov/E-Verify).

A.29. **Compliance with Applicable Laws**

The products and services supplied under the Contract shall comply with all applicable Federal, State, and local laws, and the supplier shall maintain all applicable licenses and permit requirements.

A.30. **Protests**

A supplier may protest a contract award by a state agency or OMES to the State Purchasing Director. All remedies available to suppliers through the sealed bid process pursuant to the Oklahoma Central Purchasing Act are also available to online bidders in an online bidding process.

For the complete procedures and additional information, please refer to Oklahoma Administrative Code (OAC) 260:115-3-19 – Supplier’s Protest and the OMES Central Purchasing Reference Guide website, [https://oklahoma.gov/omes/services/purchasing/reference-guide.html](https://oklahoma.gov/omes/services/purchasing/reference-guide.html).

A.31. **Special Provisions**

Special Provisions set forth in SECTION B apply with the same force and effect as these General Provisions. However, conflicts or inconsistencies shall be resolved in favor of the Special Provisions.
B. SPECIAL PROVISIONS

B.1. Contract Period
   B.1.1. The initial contract is for a twelve (12) month period, commencing date of award through one year. The contract may be renewed for up to one (1) one year option periods, upon mutual agreement of both parties.

B.2. Indefinite Quantity Contract.
   B.2.1. This is a firm fixed price contract for indefinite delivery and indefinite quantity for the supplies specified.
   B.2.2. ODOT shall not guarantee any minimum order under this contract, but shall not exceed thirty (30) maximum quantity.

   B.3.1. ODOT may extend the term of this contract up to 180 days if mutually agreed upon by both parties in writing.

B.4. Definitions
   B.4.1. The Department or Division is the Oklahoma Department of Transportation, Procurement Division.
   B.4.2. Response Documents include the Solicitation for Responses, these Instructions for Vendors, the Response Forms, other sample response forms, and any addenda issued prior to the receipt of Responses.
   B.4.3. Addenda are written or graphic instruments issued by the Department prior to the execution of the contract, which modify or interpret the Response Documents by additions, deletions, clarifications, or corrections.
   B.4.4. A Response is a complete and properly signed proposal to do the work or designated portion thereof for the sums stipulated therein, submitted in accordance with the Responding Documents.
   B.4.5. The Base Response is the sum stated in the Response for which the Vendor offers to perform the work described in the Response Documents as the Base Response.
   B.4.6. A Unit Price is an amount stated in the Response as a price per unit of measurement for materials or services as described in the Response Documents or in the proposed contract documents.
   B.4.7. A Vendor is a person or entity that submits a Response.
   B.4.8. The Owner is the State of Oklahoma represented by the Department of Transportation.

B.5. Ordering.
   B.5.1. Any supplies and/or services to be furnished under this contract shall be ordered by issuance of written purchase orders, or with the purchase card, by ODOT. There is no limit on the number that may be issued. Delivery to multiple destinations may be required. All orders are subject to the terms and conditions of this contract. Any order dated prior to expiration of this contract shall be performed. In the event of conflict between a purchase order and this contract, the contract shall have precedence.

B.6. Minimum Order Requirements
   B.6.1. Minimum orders will not be accepted.

B.7. Volume Discounts
   B.7.1. Proposers shall list any type of volume discount offered with their solicitation response.

B.8. Prompt Payment Discounts.
   B.8.1. Discounts for prompt payment will not be considered in the evaluation of offers. However, any discount offered will be annotated on the award and may be taken if payment is made within the discount period.

   B.9.1. The right of the successful offeror to perform under this contract may be terminated by written notice if the Contracting Officer determines that the successful offeror, or its agent or another representative offered or gave a gratuity (e.g., an entertainment or gift) to an officer, official or employee of the Department of Transportation.

   B.10.1. By submitting a response to this solicitation, the offeror attests that the supplies or services conform to specified contract requirements.

B.11. Indemnification and Hold Harmless Clause
   B.11.1. The Contractor shall indemnify and save harmless ODOT, their respective officers, employees and agents from all claims, suits, or actions of every kind and character made upon or brought against ODOT, their respective officers, employees and agents, for or on account of any injuries or damages received or sustained by any part or parties by or from acts of said Contractor or its servants, agents, and subcontractors, in doing the work and rendered the
services contracted for, or by or consequence of any negligence in operation, or any improper material or equipment used, or by or on account of any fact or omission of said Contractor or his or its servants, agents, and subcontractors. This hold harmless and indemnity obligation shall include attorney's fees, court cost and all other expenses incurred in the investigation and defense of any claim or suit.

B.12. Required Delivery.

B.12.1. Delivery shall be made as ordered by the agency.

B.12.2. Delivery to End Users: Authorized Users are located throughout the State, both within and outside of major metropolitan areas. Whenever possible, Authorized Users will work with Contractor to develop delivery schedules. All deliveries must be made on days and times acceptable to Authorized Users.

B.12.3. Delivery should be made within 180 calendar days after receipt of order by the successful supplier. If circumstances beyond the control of the supplier cause delivery to be more than 180 calendar days, the supplier shall notify the ordering agency immediately. Vehicles with a build date in excess of 180 calendar days should be noted in the Solicitation Response.

B.12.4. The base price for a vehicle is to include delivery to the delivery address for the ordering agency. Vehicles are to be delivered to the ordering agency with a full tank of gas. If the ordering agency elects to pick up the vehicle at the dealer's location, that vehicle is to be turned over to the ordering agency with a full tank of gas.


B.13.1. Proposals will be considered only on products, manufactured or produced for distribution for use in the United States.

B.13.2. Products shall be new and current. Factory reconditioned, refurbished or second equipment will not be accepted.


B.14.1. Vehicles must be a current product model and available for general marketing purposes at the opening of this solicitation. Bidders must use best effort to assure product availability through the duration of the contract period.

B.14.2. The awarded dealer will provide vehicles for the length of this contract period and may be approved for price modifications if a model is discontinued or is replaced by a new model. Awarded suppliers shall notify the Contracting Officer of the new model and provide pricing sheets with vehicle information within 30 days of discontinuation.

B.14.3. ODOT will not allow any cancellation of products without an equal and acceptable replacement approved by the ODOT Procurement Director or their designee. Contractors should communicate manufacturer’s discontinuation of any products to ODOT in writing within five (5) business days of notification by manufacturer. In such instances, Contractors should work with ODOT to identify and implement alternative options that will maintain or reduce costs associated with the replacements. Contractors should offer suggested replacements of discontinued products at least 30 days prior to substitution, including replacement product number, description, and final price.

B.15. Authorized Representative and Documentation

B.15.1. Bidders may offer any brand for which they are an authorized representative, which meets or exceeds the specification. Only Oklahoma licensed dealers shall be awarded a contract. Failure to be an Oklahoma licensed dealer will disqualify a bid. Per 74 OS § 564, any person or firm engaged in the sale or distribution of motor vehicles within the State of Oklahoma must possess a current, valid motor Vehicle Dealer License. Bidders should submit a copy of both their Oklahoma dealer’s license and a copy of the Manufacturer’s license for each manufacturer they are bidding.


B.16.1. The Successful offeror agrees the products furnished under this contract shall be covered by the most favorable commercial warranties the contractor gives to any customer for such products; and rights and remedies provided herein are in addition to and do not limit any rights afforded to the State of Oklahoma by any other clause of this contract.

B.17. Travel

B.17.1. No reimbursable travel is contemplated under the terms of this contract.

B.18. Additional Insurance Requirements

B.18.1. Please refer back to A.25 for basic insurance requirements. This contract requires the additional requirements as stated below.

B.18.2. General and Automobile Liability Insurance in the amount of not less than $100,000/$300,000, and Property Damage Insurance of not less than $50,000/$100,000 shall be carried by the vendor during the life of the contract. Certificates of such coverage must be returned with the contract.
B.19. Civil Rights Act of 1964

B.19.1. The Contractor agrees to comply with Title VI of the Civil Rights Act of 1964, 78 O.S. 252, 42 U.S.C. § 200d et. Seq., and all requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Part 21 – "Nondiscrimination in federally assisted programs of the Department of Transportation – effectuation of Title VI of the Civil Rights Act of 1964".

B.20. Equal Employment Opportunity

B.20.1. In connection with the execution of this CONTRACT, the CONTRACTOR shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age or national origin. The CONTRACTOR shall take affirmative action to ensure the applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, age or national origin. Such actions shall include, but not be limited to, the following: employment; upgrading; demotion or transfer; recruitment or advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

B.21. Assignment

B.21.1. The Contractor shall NOT sublet, sell, transfer, assign, or otherwise dispose of the contract or contracts or any portion thereof, or of his right, title, or interest therein, without written consent of ODOT.

B.22. Cure Cause & Breach of Contract

B.22.1. Upon written notification from requesting agency concerning the Contractor’s failure to perform up to contract specifications, the Contractor shall have three (3) calendar days to cure said deficiency and document cure to requesting agency. Three such occurrences within the contract period shall be deemed breach of contract by the Contractor and cause for ODOT to cancel this contract on seven (7) Days written notice to the Contractor. In the event of cancellation of this contract, the Contractor agrees to perform the terms and conditions of this contract up to and including date of cancellation, as though no cancellation has been made.

B.23. Work Overload Clause

B.23.1. Should circumstances be such that the Contract is unable to keep up with the work demand in a timely manner, at no fault of the Contractor, then ODOT reserves the right to seek additional services of other contractors. Such action shall not nullify this contract.

B.24. Negotiations

B.24.1. The offeror is advised that under the provisions of this Request for Proposal, ODOT reserves the right to conduct negotiations of the proposals received or to award a contract without negotiations. ODOT may negotiate if deemed necessary, and will determine the scope and subject of any negotiations. However, the Offeror should not expect that ODOT will negotiate to give the Offeror an opportunity to strengthen its proposal. Therefore, the Offeror must submit its best offer based on the terms and condition set forth in this solicitation. If such negotiations are conducted, the following conditions shall apply.

B.24.2. Negotiations may be conducted in person, in writing, or by telephone.

B.24.3. Negotiations will only be conducted with potentially acceptable proposals. The Central Purchasing Division reserves the right to limit negotiations to those proposals that received the highest rankings during the initial evaluation phase. All offeror’s involved in the negotiation process will be invited to submit a best and final offer.

B.24.4. Terms, conditions, prices, methodology, or other features of the offeror’s proposal may be subject to negotiation and subsequent revision. As part of the negotiations, the offeror may be required to submit supporting financial, pricing and other data in order to allow a detailed evaluation of the feasibility, reasonableness, and acceptability of the proposal.

B.24.5. The mandatory requirements of the Request for Proposal shall not be negotiable and shall remain unchanged unless ODOT determines that a change in such requirements is in the best interest of the ODOT.

B.25. State Purchase Card (P-Card)

B.25.1. The State currently has a contract with Bank of America to enable selected State employees to purchase needed goods and services using a State of Oklahoma purchasing card. This card functions as any consumer or commercial VISA card. There shall be no additional cost to a using entity for use of purchasing cards as a payment method. Please complete the information below as to whether your company will accept the State of Oklahoma purchasing card.

B.25.1.1. ________ - Yes – we will accept the State of Oklahoma purchasing card.

B.25.1.2. ________ - No – we will not accept the State of Oklahoma purchasing card.

B.26. Federally Funded Projects
B.26.1. Federal funds may be utilized for some projects under this contract. Contractor will be responsible for following all
federal guidelines and requirements to include, but not limited to:

B.26.1.1. All State and Federal Laws in the employment and payment of Labor. However, Davis Bacon Wages
should not apply.

B.26.1.2. All FTA Rules and Guidelines as contained in the attached FTA Special Provisions (Attachment "B")

B.27. Payment Schedule

B.27.1. The successful vendor(s) will not bill until acceptance of the vehicle by the transit sub recipient and ODOT (or other
oversight agency).

B.28. Taxation Status

B.28.1. This product may be taxable depending on the status of the purchasing sub recipient. ODOT’s tax exempt status
does not flow down to the Vendor(s) or any sub recipients.

B.29. Authority for Solicitation

B.29.1. ODOT is issuing this solicitation in accordance with Oklahoma State Statute, Title 74, Chapter 4, Section 85.3A (8).

C. SOLICITATION SPECIFICATIONS

C.1. Background

C.1.1. The Oklahoma Department of Transportation (ODOT) acts as a pass through agency for various State and Federal
funding for transit capital (buses) and wishes to create a contract to make buses available for purchase to its sub
recipients and others as purchasing rules allow.

C.2. Purpose of the Contract

C.2.1. ODOT is issuing this Request for Proposal (RFP) to select qualified supplier(s) for ADA transit vehicles for
purchasing entities to utilize.

C.2.2. It is the intent of these specifications to set forth minimum standards for the procurement of transit vehicles that
comply with 49 CFR Part 38, Subpart B, titled “Americans with Disabilities Act (ADA) Accessibility Specifications for
Buses, Vans and Systems.” All dimensions and equipment shall comply with the standards as set forth within the
CFR. The vehicles shall be new, the most current production model available and must be complete with
manufacturer’s standard equipment and accessories, fully served and ready for operation. The vehicles shall be
equipped to meet all Federal Motor Safety Standards and Procedures that apply. If these specifications contradict
any listed in the CFR, they are superseded by those in the CFR.

C.2.3. To take advantage of administrative and cost savings and to ensure that all federal requirements are met, this
procurement is assignable to other agencies, organizations and Tribal Governments funded by the Federal Transit
Administration. To include, but not limited to: Other state & local agencies, institutions, and other public bodies
may utilize the contract with written permission by the ODOT Procurement Director and if required, the Office of
Management & Enterprise Services (OMES) State Purchasing Director.

C.2.4. Any brand names and specifications mentioned within this document are for reference only. Proposals will only be
considered when brochures/specifications are included for each component provided with proposals for evaluation.

C.2.5. These services are solicited by the Oklahoma Transportation Cabinet which consists of the Oklahoma Department
of Transportation (ODOT), Oklahoma Turnpike Authority (OTA) and Oklahoma Aeronautics Commission (OAC).

C.3. Vehicle Specifications

C.3.1. Vehicle Specifications are listed in Exhibit “A”.

D. EVALUATION

D.1. Evaluation Criteria

D.1.1. This solicitation will be evaluated with Best Value criteria in accordance with Title 74, Chapter 4, Section 85.2.2.
Criteria will include, but not be limited to: Cost and Compliance with Specifications. The order in which criteria is
listed does not establish priority.

E. INSTRUCTIONS TO BIDDER

E.1. Solicitation Timeline:
E.2. Questions
E.2.1. As listed above, questions regarding this solicitation must be submitted in writing to: lbybee@odot.org by 12pm (noon) CST Friday, September 3rd, 2021.
E.2.2. Vendors should reference the section of the RFP that the question is regarding.
E.2.3. Responses received after the opening of Responses will not be considered and will be returned unopened to the Vendor.
E.2.4. Questions not in writing are invalid and will not receive consideration.

E.3. Response Documents

E.4. Copies
E.4.1. Vendors shall use complete sets of Response Documents obtained from the source indicated in the Solicitation for Responses.
E.4.2. All the copies of the Response and any other documentation required to be submitted with the Response shall be delivered electronically via email to the Buyer on this solicitation.
E.4.3. The Vendor shall assume full responsibility for timely delivery at the location designated for receipt of Responses.
E.4.4. Responses received after the opening of Responses will not be considered and will be returned unopened to the Vendor.
E.4.5. Responses not in writing are invalid and will not receive consideration

E.5. Addenda
E.5.1. Addenda will be posted on the website and sent electronically or delivered to all who are known by the Department to have received a complete set of Response Documents from the Department.
E.5.2. Copies of the Addenda will be made available for inspection at the Department.
E.5.3. No Addenda will be issued later than seven (7) calendar days prior to the date for receipt of Responses except an Addendum withdrawing the request for Responses or one which includes postponement of the date for receipt of Responses.
E.5.4. Each Vendor shall acknowledge that all Addenda and Amendments were received, by signing the Addenda and Amendment Forms.

F. CHECKLIST
F.1.1. ____ Completed Responding Bidder Information page
F.1.2. ____ Completed and Signed Non-Collusion Certification page
F.1.3. ____ Completed and Signed Solicitation Request
F.1.4. ____ Completed and Signed Addenda and Amendment Receipts, if applicable
F.1.5. ____ Read Section G.2 regarding communication during Solicitation Period

G. OTHER
G.1. Exhibit “A” – Vehicle Specifications which include pricing sheets

H. PRICE AND COST
H.1. Pricing Sheet
H.1.1. Pricing Sheets are included at the end of the specifications for each vehicle.
H.1.2. Vendors must list pricing on the provided pricing sheets, but may submit additional pricing information as an attachment.

H.2. Price Increases

H.2.1. Price increases will be permitted with the approval of the ODOT Procurement Division Director. Pricing shall be held firm for 90 days. Requests for price increases must be submitted in writing to ODOT Procurement Division at least 30 days prior to the effective date of increase. Documentation from manufacturer’s a proposed revised price list must be submitted with request. Increases will not affect any orders issued prior to the price changes.

H.3. Price Decreases

H.3.1. Price decreases are expected to be passed on to the State as supplier(s) receive them from manufacturers. Supplier(s) are to notify ODOT Procurement in writing regarding price decreases and include a revised price list. ODOT will have up to thirty (30) days to implement any requests for price decreases.
H. SOLICITATION SPECIFICATIONS FOR 45’ CNG COMMUTER COACH

H.1. DELIVERY

H.1.1. Vehicle must be delivered at a maximum of 180 calendar days from the date a Purchase order is issued. Pre-delivery servicing and adjustments: prior to acceptance by the purchaser, the vendor shall service and adjust each vehicle for operation. This process shall include but not be limited to the following:

H.1.1.1. The vehicle must have a full tank of fuel when delivered.

H.1.1.2. Each bus shall be designed to facilitate the disassembly, reassembly, servicing or maintenance thereof by use of tools and items that are normal and available as commercial standard items. The body and structure shall be designed for ease of maintenance and repair.

H.1.1.3. All parts added, as part of the modification process shall be new.

H.1.1.4. Headlights properly aligned

H.1.1.5. Engine Tuned

H.1.1.6. All accessories properly adjusted

H.1.1.7. Electrical, braking and suspension systems inspected

H.1.1.8. Both batteries Charged

H.1.1.9. Front-end aligned, all wheels balanced, including spare

H.1.1.10. All lubricants checked, and greased if needed

H.1.1.11. Cooling system serviced with permanent type anti-freeze and summer coolant for minus 20 degrees F (-28.888C).

H.1.1.12. Warranty papers and owner’s guide


H.1.1.14. Odometer cannot exceed 3,000 miles at the time of delivery of completed buses to the purchasing agency. There will be a charge of one dollar ($1.00) per mile for each vehicle with an odometer reading in excess of 3,000 miles payable to the purchasing agency at the time of delivery.

H.1.1.15. Under no circumstances are tow vehicles to be attached to any buses.

H.1.1.16. Each vehicle must be delivered to the agency submitting the P.O.

H.2. CERTIFICATE OF ORIGINS

H.2.1. Copies of all Certificate of Origins and signed invoices must be emailed to the organization named on the purchase order five business days before delivery is made and originals must be delivered with the vehicle: receipt of these after delivery is not acceptable.

H.3. NOTIFICATION

H.3.1. Vendor shall notify buyer of vehicle delivery ten business days prior. NOTE: If these specifications contradict any listed in the Federal Regulations, they are superseded by those of the Federal Regulations.

H.4. CLASSES OF FAILURES

H.4.1. Class 1: Physical Safety. A failure that could lead directly to passenger or driver injury and represents a severe crash situation.

H.4.2. Class 2: Road Call. A failure resulting in an en route interruption of revenue service. Service is discontinued until the coach is replaced or repaired at the point of failure.

H.4.3. Class 3: Coach Change. A failure that requires removal of the coach from service during its assignments. The coach is operable to rendezvous point with a replacement coach.

H.4.4. Class 4: Bad Order. A failure that does not require removal of the coach from service during its assignments, but does degrade coach operation. The failure shall be reported by driver, inspector, or hostler.

H.5. LEGAL REQUIREMENTS

H.5.1. The coach shall meet all applicable Federal Motor Vehicle Safety Standards and regulations as established by the U.S. Department of Transportation.
H.5.2. The manufacturer shall comply with all applicable Federal and State regulations. In event of any conflict between the requirements of this Specification and any applicable legal requirement, then the legal requirement shall prevail.

H.6. OVERALL REQUIREMENTS

H.6.1. DIMENSIONS

H.6.2. PHYSICAL SIZE

H.6.3. With the exceptions of exterior mirrors, marker and signal lights, bumpers, flexible portions of the bumper, fender skirts, and rub rail, the coach shall have the following overall dimensions.

H.6.3.1. Length: 45 feet, 0 inches (+0 / -1 in.) (14 m – +0 / - 25.4 mm)

H.6.3.2. Width: 8 feet, 6 inches (+0 / -1 in.) (2.6 m – +0 / - 25.4 mm)

H.6.3.3. Height: 137 inches – maximum loaded or unloaded. (3.5 m)

H.6.3.4. First Step Height: 15.5 inches – Maximum (394 mm)

H.7. UNDERBODY CLEARANCES

H.7.1. The coach provided shall meet the following underbody clearances:

H.7.1.1. Approach Angle: 9.50°

H.7.1.2. Breakover Angle: 7.20° (measured per SAE J689)

H.7.1.3. Departure Angle: 6.20°

H.7.1.4. Ground Clearance: 10.00 inches (254 mm)

H.7.1.5. Axle Clearance (as measured): 6.50 inches (165 mm)

H.8. WEIGHT AND AXLE LOADING

H.8.1. Each vehicle, at a capacity load, shall not exceed the gross vehicle weights or maximum axle weights specified. In no case shall the axle weight exceed 22,500 pounds on any axle. In the interest of economy in construction and operation it shall be the goal to manufacture the coach as light as possible without degradation of structure, performance, appearance, comfort and reliability. Total vehicle weight shall not exceed the gross vehicle weight rating nor axle weight rating at ground as specified. GVWR shall not exceed 50,000 pounds for a 45-foot bus. Combined load capacity weight on the drive and tag axles shall not exceed 36,500 pounds.

H.9. CAPACITY

H.9.1. Rated passenger capacity of the coach shall be as outlined below. Provisions to secure two wheelchair passengers shall also be provided. The overall seating capacity may be reduced when the securement positions are being utilized.

H.9.1.1. 45 foot/102 inch (14 m/2.6 m) bus 57 seats

H.9.1.2. 45 foot/102 inch (14 m/2.6 m) bus w/optional lavatory 55 seats

H.10. SERVICE LIFE AND MAINTENANCE

H.10.1. SERVICE LIFE

H.10.1.1. The coach shall be designed to operate in commuter service for at least 12 years or 500,000 miles (804,672 km) of revenue service whichever comes first.

H.11. MAINTENANCE AND INSPECTION

H.11.1. 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 (9,656 km), except for routine daily service performed during the fueling operations. Higher levels of scheduled maintenance tasks shall occur at even multiples of mileage for lower level tasks.

H.11.2. The manufacturer shall provide a preventive maintenance schedule covering all components upon delivery of the first production vehicle. Each schedule shall be complete and shall adhere to frequency intervals considered normal industry standards.

H.12. MEAN MILEAGE BETWEEN FAILURES
H.12.1. The following are design goals for mean mileage between failures by failure class, provided that all specified preventive maintenance procedures are followed:

H.12.1.1. **Class 1**: Physical Safety. Mean mileage shall be greater than 1,000,000 miles (1,609,344 km).

H.12.1.2. **Class 2**: Road Call. Mean mileage shall be greater than 20,000 miles (32,187 km).

H.12.1.3. **Class 3**: Coach Change. Mean mileage shall be greater than 16,000 miles (25,750 km).

H.12.1.4. **Class 4**: Bad Order. Mean mileage shall be greater than 10,000 miles (16,093 km).

**H.13. ACCESSIBILITY**

H.13.1. All systems or components serviced as part of periodic maintenance or whose failure may result in Class 1 or Class 2 failures shall be readily accessible for service and inspection. Removal or physical movement of components unrelated to the specific maintenance and/or repair tasks involved shall be minimized.

**H.14. INTERCHANGEABILITY**

H.14.1. Components with identical functions shall be interchangeable with the exception of windows and baggage bay doors. Components with non-identical functions shall not be, or appear to be, interchangeable.

**H.15. OPERATING ENVIRONMENT**

H.15.1. The coach shall achieve normal operation in temperature ranges of -10 to 110 degrees F (-23º to 43º C), at relative humidity between 5 percent and 100 percent and at altitudes up to 5,000 feet (1,524 m) above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below -10 degrees F (-23º C) and above 110 degrees F (+43º C) or at altitudes above 5,000 feet (1,524 m). Special equipment or procedures may be employed to start the coach after a 12 hour or more exposure to temperatures below +30 degrees F (+1º C) without the engine in operation.

H.15.2. Speed, gradability, and acceleration performance requirements shall be met at, or corrected to, 85 degrees F (29 C), 29.00 inches (737 mm) Hg, dry air. Performance degradation at conditions other than the test standard shall not exceed 1 % for each 3 degrees F/C and 4 % for 1,000 feet (305 m) of altitude above the standard.

**H.16. MATERIALS AND CONSTRUCTION**

H.16.1. For economy in maintenance, it is essential that parts and units be arranged so that rapid assembly and disassembly will be possible for the coach being provided. The dimensions of all parts, unless particularly specified, will be in accordance with current standards of the Society of Automotive Engineers, or the metric equivalents. All units or parts not specified shall be Manufacturer’s standard units or parts and shall conform in material, design and workmanship to industry standards and shall meet or exceed all Federal and State motor vehicle safety standards. During the manufacturing of the coaches all parts shall be new and in no case will used, reconditioned or obsolete parts be accepted. No advantages shall be taken by the Manufacturer in the omission of any parts or details that make the coach complete and ready for service, even though such parts or details are not mentioned in these specifications.

H.16.2. Workmanship throughout shall conform to the high standard of commercially accepted practice for the class of work and shall result in a neat and finished appearance. All exposed surfaces and edges shall be smooth, free from burrs and other projections, and shall be neatly finished. Exposed metal surfaces, prior to paneling or covering shall be properly prepared and coated with protective material to insure against corrosion or deterioration.

H.16.3. All lubrication points, unless otherwise specified, shall be capable of accepting a high pressure grease gun operated on fittings that permit grease to travel into the lubrication point but does not permit the grease to escape and designed so that when the grease gun is withdrawn, there is a positive barrier preventing dirt from entering the fitting. These fittings shall be of one manufacture and shall be accessible for a grease gun while the vehicle is being serviced on either a lift or a pit.

**H.17. BODY**

**H.17.1. DESIGN**

H.17.1.1. The coach shall have a clean, smooth, simple design, primarily derived from coach performance requirements and passenger service criteria. Body construction shall not be of a body on chassis type. The exterior and body features, including grilles and louvers, shall be shaped to allow complete and easy cleaning by automatic bus washers without snagging washer brushes. The retention of water and dirt in or on any of the body features or the freezing or bleeding out of this dirt and water after leaving the washer shall be minimized. 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 coach.
Accumulation of spray and splash on any window of the coach generated by its wheels on a wet road shall be minimized. The undercarriage of the coach shall be sealed off to the maximum extent practicable to significantly reduce the intrusion of road spray.

H.18. MATERIALS
H.18.1. Body materials shall be selected and the body fabricated to reduce maintenance, extend durability, and provide consistency of appearance throughout the life of the coach. Detailing shall be kept simple; add-on devices and trim shall be minimized and, where necessary, integrated into the basic design.

H.19. FINISH AND COLOR
H.19.1. All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly cleaned and primed as appropriate for the paint used, 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 coach.

H.19.2. Paint utilized shall be DuPont Imron Elite SS white N5793EA polyurethane enamel or approved equal, that exhibits excellent color and gloss retention, chip, abrasion, stain and mar resistance, chemical and solvent resistance and excellent cleaning characteristics per industrial standards. Paint shall be applied smoothly and evenly with the finished surface free of dirt, runs, sags, “orange peel” type pebbled surface, and other imperfections.

H.19.3. All exterior finished surfaces shall be impervious to diesel fuel, gasoline, and commercial cleaning agents such as soaps, detergents and degreasing compounds. Finished surfaces shall not be damaged by controlled applications of commonly used graffiti-removing chemicals.

H.20. NUMBERING AND SIGNING
H.20.1. Monograms, numbers and other signing shall be applied to the inside and outside of the coach as required. Signs shall be durable and fade, chip, and peel-resistant; they may be decals, or pressure-sensitive appliqués. Emergency exit information shall be provided in both English and Spanish.

H.21. PEDESTRIAN SECURITY
H.21.1. Exterior protrusions greater than 0.250 inch (6.0 mm) and within 80 inches (203 cm) of the ground shall have a radius no less than the amount of the protrusion. The left and right side rear view mirrors, windshield washer nozzles and required lights and reflectors are exempt from the protrusion requirement. Grilles, doors, bumpers and other features on the sides and rear of the coach shall be designed to minimize the ability of unauthorized riders to secure toeholds or handholds.

H.22. STRUCTURE
H.22.1. STRENGTH AND FATIGUE LIFE
H.22.1.1. The structure shall be of a sufficiently strong and efficient design to withstand the conditions of commuter service throughout the service life of the coach.

H.23. DISTORTION
H.23.1. 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 (152 mm) curb or in a 6 inch (152 mm) deep hole.

H.24. RESONANCE
H.24.1. 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.

H.25. MATERIAL
H.25.1. Reinforced fiberglass and plastic materials shall be excluded from structural body construction, except for replaceable panels or doors and for non-load bearing front and rear roof caps and the front lower panel below the windshield and the A-pillar covers and transom panels.

H.26. CORROSION
H.26.1. The coach shall resist corrosion from atmospheric conditions and road salts. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, provided it is maintained in accordance with the procedures specified in the service manual. All exposed body panels above and below the floor line shall be aluminum or stainless steel except for the front end upper and lower panels, the rear end upper panels and the upper sidewall panel which are made of fiberglass or galvanized steel.
Materials exposed to the elements and all joints and connections of dissimilar metals shall be corrosion-resistant and shall be protected from galvanic corrosion. All frame members below the passenger floor that are subject to road splash and are less than 0.06 inch (1.5 mm) shall be stainless steel for maximum corrosion protection. All other frame members exposed to splash are to be High Strength Low Alloy steel and are to be 0.06 inch (1.5 mm) thick minimum and shall be coated with Tectyl undercoating or approved equal, on all surfaces exposed to road splash for maximum corrosion protection.

H.26.2. Floor supports in the passenger and drivers area, the sidewall structures and roof structures that are not exposed to road spray shall be High Strength Low Alloy and primed prior to incorporation into the coach assembly.

H.26.3. Outer sidewall panels above the passenger floor and below the windows shall be galvanized steel, pre-primed. The roof panels shall be pre-primed aluminum both sides and the front and rear roof caps fiberglass.

H.26.4. The upper rear engine door and louvers may be fiberglass panels mounted to stainless steel frames with powder coated aluminum screens. The upper side corner panels may be fiberglass with powder coated aluminum screens.

H.26.5. The upper wheelchair lift door may be made of an aluminum frame or other acceptable lightweight material and aluminum exterior panel.

H.26.6. Non-structural underbody panels used for baggage bay floors and to retain insulation in other areas, shall be Tectyl or approved equal undercoated aluminum or stainless steel for maximum corrosion protection. In the wheel well areas, non-structural closeout panels shall be stainless steel.

H.26.7. Before assembling, all metal body parts must be given a thorough anti-corrosion treatment. Joints between dissimilar metals shall be properly insulated with an inert plastic tape to avoid corrosion due to electrolytic action. All nuts, bolts, clips, washers, clamps, and like parts shall be zinc plated, phosphate coated, black oxide coated, or nylon to prevent corrosion. All exterior joints and seams must be sealed.

H.26.8. Dissimilar metals must be separated by a non-conductive barrier.

H.26.9. Non-Conductive Barriers may consist of one of the following:

H.26.9.1. Black elastic compound tape
H.26.9.2. Mylar tape
H.26.9.3. Double-sided structural adhesive tape

H.26.10. Where tape barriers are not feasible an appropriate sealant shall be used to provide a protective barrier and a water tight seal. This sealer must be used on all panels and assemblies that are susceptible to water leaks.

H.27. TOWING

H.27.1. Towing devices shall be provided and be permanently mounted on the front and rear of the coach. The coach may be towed from the front only, but can be recovered from the rear. Recovery shall mean to move the bus into the clear so it can be hooked up and towed from the front. Lift and tow is not required.

H.27.2. Front towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the coach within 20° of the longitudinal axis of the coach. Towing device shall accommodate a crane hook with a 1-inch throat. A minimum of two steel rear skid plates measuring approximately 15.2 x 3.3 inches (386 x 84 mm) shall be welded to the underside of the engine rails. Skid design shall be durable construction to adequately protect mechanical or other body components from damage due to the coach bottoming out.

H.28. JACKING & HOISTING

H.28.1. It shall be possible to safely jack up the bus, at curb weight, with an 8.5 inch (216 mm) high hydraulic hand jack or a 10-ton (9,072 kg) floor jack when a tire or dual set is completely flat and the bus is on a level hard surface. Jacking from a single point shall permit raising the bus sufficiently high enough to remove and reinstall any wheel and tire assembly. The bus shall be fitted with jacking pads for each tire/wheel locations and shall permit easy and safe jacking with the flat tire or dual set on a 3.5-inch (89 mm) high run-up block not wider than a single tire. The bus will withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage. The bus axles or jacking plates shall accommodate the lifting pads of a post hoisting system. Jacking plates shall be approximately 2.00 inches (51 mm) square, with a turned-down flange not less than 0.5 inch (13 mm) deep on each side. Other pads shall be provided to support the bus on jack stands independent of the hoist.
H.29. FIRE SUPPRESSION

H.29.1. An Amerex or approved equal modular vehicle fire suppression and overheat warning system will be provided to detect and extinguish fires in the engine compartment. The system will be electrically controlled. A 25-lb. (11-kg) dry-chemical extinguisher cylinder will be installed in the #3 baggage compartment. Three thermostats and four extinguisher nozzles will be installed in the engine compartment in strategic locations. If the thermostats detect excessive heat, then the cylinder will discharge a dry chemical agent into the engine compartment. A button at the end of the left-hand console will trigger the extinguisher. A control panel above the driver will monitor the system. Normally a green LED indicating “System OK” will be illuminated on the front of the monitor. When a fire is detected a red LED and buzzer on the control panel will warn the driver. When the fire has been extinguished the green LED will light again.

H.29.2. The fire suppression system will be powered by the coach’s electrical system, but an internal rechargeable back-up battery will be provided in case the coach’s electrical system is interrupted.

H.30. FIRE PROTECTION

H.30.1. The passenger and engine compartments shall be separated by a bulkhead(s) which shall, by utilization of fire resistant materials in its construction, be a firewall. This firewall shall preclude or retard propagation of an engine compartment fire into the passenger compartment. Only necessary openings shall be allowed in the firewall, and these shall be fire resistant. Any passageways for climate control system air flow shall be separated from the engine compartment by fire resistant material. Piping through the center tunnel bulkhead shall be copper, steel, nylon air brake tubing (for air and fuel), PVC (closed conduit) or brass and shall be sealed with fire-resistant material at the firewall. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the firewall. The conduit and bulkhead connectors shall be sealed with fire resistant material at the firewall. Engine access panels in the firewall shall be fabricated of fire resistant material and secured with fire resistant 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. The coach body shall be adequately sealed to prevent the intrusion of smoke, fuel, and fumes into the coach interior.

H.31. LEAK DETECTION SYSTEM

H.31.1. A mobile gas leak detection system manufactured by Amerex Corporation or approved equal shall be provided. Methane detection capability shall be provided in the follow areas:

H.31.2. Engine compartment one detector minimum. Fuel storage area - as required.

H.31.3. Detectors are to be designed to prevent vandalism or damage from external sources.

H.31.4. The AMGADS III system, or approval equal, shall detect and quantify airborne concentrations of methane from 0 % LEL to 100 % LEL and shall continue to give the indication of the presence of gas at concentrations above 100 % LEL.

H.31.5. The system shall be integrated with the engine stop override system to permit the operator more time, if required, to stop the vehicle. The system shall be powered through the battery insulation switch(es) and be in full time sampling mode any time the master control switch is in the “on” position. The system shall be self-restarting following power interruption or have backup batteries to prevent interruption of function.

H.31.6. The system shall be capable of operating normally without failure from -65 degrees F to +185 degrees F, and at relative humidity levels from 0% to 99%. Components operating within the engine compartment shall operate in temperatures up to 250 degrees F. Any single failure of a detection device shall cause an indicator light on the control panel to illuminate.

H.31.7. The system shall operate at supply voltages from 9 to 30 VDC as produced by the coach electrical system, and be designed to withstand positive and negative voltages spikes of 500 VDC, and electrostatic discharge of 15000 volts without failure. Total current draw of the system under normal operating conditions shall not exceed 750 mA. System design shall comply with SAE J1211 criteria for automotive electronic equipment as a minimum.

H.32. ALARM LEVELS

H.32.1. The system shall generate audible and visual alarms at two non-adjustable concentration levels. The system shall also supply one user assignable auxiliary shift relay for such functions as alarms and signal light actuation, fuel valve shut off and ignition interruption. Alarms shall provide audible notification of detector activation inside the coach.

H.33. CALIBRATION REQUIREMENTS
H.33.1. The system shall register and report zero drift as a dangerous situation requiring attention. Drifts in calibration at other than the zero level shall either always be such as to produce a failsafe (false high) reading or shall give notification of a reading as a dangerous situation requiring attention (false low).

H.34. MONITOR PANEL

H.34.1. The system shall have a supervision monitoring panel located in the operator's area. The monitor panel shall indicate operational status of the sensors, harness, and calibration with visual indicators provided on the operators indicator panel.

H.35. EXTERIOR AND APPLIED PANELS

H.35.1. Roof Panels - Front roof cap and rear crown panels shall be nominal 0.13 inch (3.17 mm) thick fiberglass-reinforced, molded plastic incorporating molded indentations for the marker, clearance and identification lights. Main roof panels shall be 16 gauge, nominal 0.05 inch (1.29 mm), high tensile primed aluminum. Roof panels shall be bonded to the roof structure with adhesive.

H.35.2. Front Panels - The front body panel below the windshield shall be of one-piece molded fiberglass. A fiberglass trim fascia shall be provided under the windshield. It shall include molded housings for the headlamp, turn signal and clearance lamp assemblies.

H.36. STRENGTH AND INSTALLATION

H.36.1. Exterior panels above and below the rub rail may be structural components. Panels shall be secured to structural members and shall have a smooth finish with no sharp edges.

H.37. REPAIR AND REPLACEMENT

H.37.1. Exterior panels below the rub rail shall be divided into sections that are repairable or replaceable by a mechanic. Baggage doors shall be two part with the joint at or below the rub rail.

H.38. RAIN GUTTERS

H.38.1. Gutters shall be provided to minimize water flowing from the roof onto the side windows and passenger doors.

H.39. LICENSE PLATES

H.39.1. A recessed mounting area shall be provided to mount a standard size U.S. license plate on the rear of the coach. This provision shall recess the license plate so that automatic coach washing equipment brushes will not catch on the license plate. Four fasteners shall be utilized to retain the license plate. The license plate shall be mounted to the left of the coach center. Provision shall be made to illuminate the surface of the rear license plate.

H.40. RUBRAILS

H.40.1. Rub rails shall have a minimum height dimension of 2.50 inches (64 mm) and shall be composed of flexible, resilient material to protect both sides of the coach body from damage caused by minor sideswipe accidents. The rub rail may be discontinued at doorways and the condenser intake grille. A damaged portion of the rub rail shall be replaceable without requiring removal or replacement of the entire rub rail.

H.41. MOLDINGS

H.41.1. Sash Moldings – Painted aluminum sash moldings shall be installed along the bottom length of the passenger windows.

H.41.2. Belt Moldings – Painted aluminum belt moldings shall be installed along the left and right hand belt lines of the coach.

H.42. PARCEL RACKS

H.42.1. A minimum 10 module parcel rack without dividers and compartment doors shall be furnished over all two-passenger seating positions except in the wheelchair door area. Retention cords shall run the length of the rack housing except where air conditioning components are housed. These compartments will have dividers and locking doors. The parcel rack edge, running along the full length of the aisle, shall incorporate a handhold for use by standees. Passenger headroom measured from the rack end to the top of the seat headrest, shall be a minimum 17 inches (432 mm). Interior window post caps shall be ABS, thermo formed plastic, off-white in color to provide a clean finished appearance. The interior of the rack shall be vinyl covered aluminum to complement the interior. Parcel racks shall be supported by polycarbonate glass filled hangers spaced approximately 40 inches (1,016 mm) apart. Total capacity shall be a minimum 109 ft.³ (3 m³) to allow for ample storage space for carry-on items.
H.42.2. Passenger service modules mounted on the underside of the parcel rack shall include individually controlled and adjustable LED passenger reading lights, and an exit signal push button, red in color and individual air distribution outlets receiving air from the parcel rack HVAC system. These outlets shall be adjustable from fully closed to full open position. A minimum of twenty-six speakers shall also be provided in the cluster panels for the driver controlled public address system. Speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. Passengers utilizing the securement systems shall be provided identical amenities as provided for all other passengers except that the parcel rack shall be deleted in the area of the wheelchair lift door. Separate and independent notification will be provided on the dashboard indicator panel for stop request notification from securement positions.

H.43. UNDERFLOOR BAGGAGE COMPARTMENTS

H.43.1. Full width under floor baggage compartments shall be provided between the front and rear axles. Each compartment shall be separated by an aluminum panel except the front and rear bulkheads shall be stainless steel. The compartment doors shall be a two part with the joint at or below the rub rail, fully sealed vertical lift pantograph type. Each door shall include an aluminum or composite frame with an aluminum outer panel. Doors shall be spring counter balanced for ease of operation.

H.43.2. The no. 1 right hand, curbside baggage door shall have a key lock. All other baggage doors shall be equipped with air locks. Each baggage door shall have a 4.0 x 10 inch (102 x 254 mm) flush mounted breakaway type latch handle located with a center point approximately 38 inches (965 mm) off the ground.

H.43.3. Each under floor compartment shall be pressurized and illuminated with two LED lamps when the doors are opened. The lamp fixtures shall be sealed to preclude the intrusion of dust and moisture into the fixture. The floor of the baggage compartments shall be corrugated aluminum.

H.44. INTERIOR

H.44.1. HEADROOM

H.44.1.1. Headroom above the aisle shall be no less than 78 inches (1,981 mm). If an engine brake is to be provided, then a “hump” ahead of the rear cross seat will decrease headroom to approximately 74 Inches (1,880 mm).

H.45. DRIVER’S BARRIER

H.45.1. A barrier or bulkhead between the driver and street side front passenger seat shall be provided. The barrier shall eliminate glare and reflections from interior lighting in the windshield directly in front of the barrier during night operation.

H.45.2. The driver’s barrier shall be constructed of opaque .472 inch (12 mm) thick acrylic glazing. The barrier shall be a shatter-proof acrylic sheet that meets AS standards AS-4 or AS-5. The glazing shall be indelibly marked with the manufacturer’s name and type of material.

H.45.3. The drivers barrier shall extend from below the level of the passenger or driver seat cushion, whichever is lower, to above the level of the seated driver’s head and shall fit within 1.5 inches (38 mm) from the coach side window/wall to prevent passengers from reaching the driver or his/her personal effects. The barrier design shall accommodate a minimum of 9.05 inch (230 mm) fore and aft travel of the specified operator’s seat.

H.45.4. On the aisle side, the barrier shall be cut out from the vertical stanchions to permit passengers to use the stanchion as a handhold. Any panels above and below the glazing shall be complementary in color to the sidewall material.

H.45.5. All controls, including the driver's dimmer switch for first two rows of reading lights will be relocated to the LH Console and the RH. Console deleted.

H.46. MODesty PANELS

H.46.1. Sturdy modesty panels constructed of durable, unpainted, corrosion-resistant material complementing the interior trim shall be provided at the rear of the step well. The modesty panel and its mounting shall withstand normal kicking, pushing, and pulling loads of 200-pound (91 kg) passengers without permanent visible deformation.

H.47. REAR BULKHEAD

H.47.1. The rear bulkhead paneling shall be contoured to fit the ceiling, side walls and seat.

H.48. CONSTRUCTION
H.48.1. Interior panels may be integral with, or applied to, the basic coach structure. They shall be
decorated in accordance with and compliment the interior specified. Use of moldings and small pieces of
trim shall be minimized, and all parts shall be functional. Panels shall be of backed melamine, vinyl-clad
aluminum or vinyl-clad steel. Front and rear closures shall be fiberglass with color molded in, and there
shall be no painted surfaces. The lower sidewall shall be Melamine covered panels or approved equal,
sectionalized for ease of repair.

H.49. FASTENING

H.49.1. Interior panels shall be attached so that there are no exposed edges or rough surfaces. Panels and
fasteners shall not be easily removable by passengers. Interior trim fasteners, where required, shall be
rivets, Phillips, or tamper-proof screws.

H.50. FLOOR

H.50.1. STRENGTH

H.50.1.1. The floor deck may not be integral with the basic structure but shall be mounted on the
structure securely to prevent chafing or horizontal movement. Sheet metal screws shall not be
used to retain the floor. All floor fasteners shall be secured and protected from corrosion for the
service life of the coach. The floor deck shall be reinforced as needed to support passenger
loads. At GWR, the floor shall have an elastic deflection of no more than 0.375 inches (10 mm)
from the normal plane. The floor shall withstand the application of 3.0 times gross load weight
without permanent detrimental deformation.

H.51. EDGES

H.51.1. The floor shall be essentially a continuous flat plane, except at the step well. Where the floor meets
the walls of the coach, the surface edges shall be blended with a circular section of radius not less than .5
inch and a molding or cover shall prevent debris accumulation between the floor and wall. Interior flooring
shall be flat throughout except for an 8 ft. (2.4 m) long welded ramp in the aisle section at the front
which is sloped 5.35 degrees and has a 3 inch (76 mm) riser under the #1 RH and #1 LH passenger
seats except for a “hump” in front of the rear cross seat (when engine brakes are provided). The floor is
attached to the underframe with adhesive and rivets. Wheel housings may not extend above floor line.

H.51.2. Access openings in the floor shall be sealed to prevent entry of fumes and water into the coach
interior. Flooring material shall be flush with the floor and shall be edge-bound with stainless steel to
prevent the edges from coming loose. Access openings may be symmetrical if the fasteners are arranged
to ensure alignment of the flooring. Fasteners shall be flush with the floor when secured.

H.51.3. Rubber flooring adhesion procedure includes butt cut type edges that are securely bonded to the
plywood floor with a waterproof adhesive. Flooring areas which are edge-bound with stainless steel shall
include the sidewall on each side, the ramp in the center aisle, the base of rear cross seat, the step up
under the number 1 seat, the driver’s modesty panel and the RH front passenger’s modesty panel.

H.52. FLOOR PROTECTION

H.52.1. The floor, as assembled, including the sealer, attachments, and covering, shall be waterproof, non-
hygroscopic, resistant to heat, dry rot, mold growth, and impervious to insects. Plywood shall be no less
than one half-inch thick 5 ply water resistant Douglas Fir per CSA 0121-M1978 or PS1-95 (APA) and shall
be installed with all edges sealed. The floor in the aisle shall be no less than an overall thickness of one
half-inch water resistant Douglas Fir per CSA 0121-M1978 or PS1-95 (APA).

H.53. STEPS AND STEPWELL

H.53.1. STEPS

H.53.1.1. There shall be no more than 4 steps and no step shall be located between the
vestibule and passenger compartment. A ramp shall be provided in this area with the rate of
rise not to exceed 0.75 inch (19 mm) per foot with a maximum vertical rise of 9.0 inches (229
mm).

H.53.1.2. All step treads shall be of uniform depth no less than 11 inches (279 mm) and a uniform
height of no less than 9.5 inches (241 mm). Except for the first step, the plane of the step treads
shall be parallel to the plane of the floor. Treads shall be covered with RCA flooring or approved
equal that shall remain effective in all weather conditions. Color of the tread covering shall match
the vestibule flooring. The edge of the vestibule floor shall have no overhang at the step riser.
The edge of the vestibule floor and the edge of each of the step treads shall have a bright,
contrasting white band, 2 inches (51 mm) wide, the width of the step. This band shall be uniform
in width across the entire step and vestibule edge.
H.54. **STEPWELL CONSTRUCTION**

H.54.1. Step well shall be constructed entirely of stainless steel. The steps shall simultaneously support 300 pound (136 kg) loads evenly distributed over the center half of each step tread without permanent deformation and with elastic deflection of no more than 0.0625 inches (1.6 mm). Each step tread shall support a load of 500 pounds (227 kg) evenly distributed over the center half of the tread without permanent deformation. A minimum 1.0 inch (25.4 mm) thick Tuf-Coat or approved equal, self-adhesive insulation shall be provided behind the step well area for added control of interior temperature variances and to minimize road noise.

H.55. **WHEEL HOUSING**

H.55.1. **CONSTRUCTION**

H.55.1.1. Wheel housings shall be constructed of stainless steel. Wheel housing, as installed and trimmed, shall withstand impacts of a 2-inch (51 mm) steel ball with at least 200 foot-pounds (271 Nm) of energy without penetration.

H.56. **CLEARANCE**

H.56.1. Sufficient clearance and air circulation shall be provided around the tires, wheels, and brakes to preclude overheating. Interference between the tires and any portion of the coach shall not be possible in maneuvers up to the limit of tire adhesion with weights from wet to GVWR.

H.57. **FENDER SKIRTS**

H.57.1. Front and rear wheel wells shall be fully skirted with rubber to minimize spray and splash. The fender skirts shall be damage resistant and easily replaceable. They shall be flexible if they extend beyond the allowable body width. Wheels and tires shall be removable without disturbing the fender skirts.

H.58. **SPLASH APRONS**

H.58.1. Splash aprons, composed of 0.25 inch (6 mm) minimum composition or rubberized fabric or 0.188 inch (5 mm) nylon reinforced rubber, shall be installed behind all wheels and shall extend downward. Apron widths shall be no less than tire widths. Splash aprons shall be bolted to plates which are welded to the coach understructure. The plates shall support the splash apron across its entire width. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. Splash aprons and their attachments shall not be included in the road clearance measurements. Other splash aprons shall be installed where necessary to protect coach equipment.

H.59. **PASSENGER ENTRANCE DOOR**

H.59.1. An electrically controlled, air-operated, power bi-fold door with keyed lock, will be located forward of the right front wheel. The non-symmetrical door will have a clear opening width of 30 inches (762 mm) up to a height of 44 inches (1117 mm). The clear door opening height will be 84.5 inches (2,146.3 mm).

H.59.2. The door shall be of composite material construction with a stainless steel kick panel for the lower portion. A molded fiberglass-reinforced panel shall be on the interior of the door. Upper and lower hinge assemblies shall be cast, with a stainless steel lower hinge pin pivoting inside a spherical bearing.

H.59.3. An upper – primary and lower – secondary window shall be installed in the entrance door. The primary double-glazed window in the upper half of the door shall be of AS-2 laminated heat-absorbing safety glass. The secondary window, located in the lower section of the door, shall be of 0.5-inch (12.7 mm) acrylic.

H.59.4. Door control shall be provided by a momentary switch, located to the left of the steering wheel. An exterior remote external control switch shall also be located in a side-wall pocket by the entrance door. The door shall have positive automatic air lock with overrule. The air lock will be automatically actuated by a micro switch when the door is in the closed position.

H.59.5. An entrance door key lock shall be provided on each coach along with two spare keys.

H.60. **SERVICE COMPARTMENTS AND ACCESS DOORS**

H.60.1. **INTERIOR**

H.60.1.1. Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Removal of fixtures or equipment unrelated to the repair task to gain access shall be minimized. Access doors, if hinged, shall be hinged with props, as necessary, to hold the doors up and out of the mechanic’s way with the exception of the destination sign box door which hinges down and is held by straps in the open position. Panel fasteners shall be standardized so that only two tools are required to service all special fasteners within the coach. These fasteners shall be captive in the panel except for the engine
compartment and antenna access hatches. Access doors for the door actuator compartments shall be secured with hand screws or latches, and shall be sealed to prevent entry of mechanism lubricant into the coach interior. All hinges and props must be designed to preclude accidental closure when the panels are opened.

H.60.2. EXTERIOR

H.60.2.1. Vertically 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, engine lubricant, transmission fluid and the windshield washer reservoir. The upper engine radiator/C.A.C. compartment door shall be vertically hinged with a locking latch located behind the engine compartment doors. Access to these compartments shall be from outside the coach. 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 be capable of withstanding severe abuse throughout the life of the coach. They shall close flush with the body surface. All service/maintenance doors, excluding baggage compartment 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 coach washing operations. Doors with top hinges shall have props stored behind the door or on the door frame. All access doors (except vertically hinged access doors) shall be sufficiently retained in the open position by props or counterbalancing, as with baggage compartment doors. Springs and hinges shall be corrosion-resistant and shall last throughout the service life of the coach. Latch handles shall be sized to provide an adequate grip for opening. Large access doors shall hinge up and out of the way or fold flat against the coach body and shall be easily operable by one person. These doors, when opened, shall not restrict access for servicing other components or systems. Retention devices utilized to hold the engine compartment access doors in the open position shall be heavy duty and designed to last the service life of the coach.

H.61. OPERATING COMPONENTS

H.61.1. DOORS

H.61.1.1. Operation of, and power to, the passenger door shall be completely controlled by a switch located in close proximity to the driver to the left of the steering wheel. A control or valve in the driver’s compartment shall shut off the power to, and/or dump the air from the front door mechanism to permit manual operation of the front door with the coach shut down. A toggle switch on the exterior of the coach shall permit opening of the front door. The switch shall be concealed behind an unmarked flip up cover. The door switch cover shall be spring loaded so as to be held in the closed position and be located rearward of the entrance door.

H.62. ACTUATORS

H.62.1. The nominal door opening and closing speed shall be in the 3-5 second range. The maximum door opening and closing speeds will be regulated using fixed, maintenance free orifices and airline sizes. If required, door speeds can be decreased with the addition of a flow-restricting device. Actuators and the complete door mechanism shall be concealed from passengers, but shall be easily accessible for servicing.

H.63. MANUAL OPERATION

H.63.1. In the event of an emergency, it shall be possible to open the door manually from inside the coach after actuating an unlocking device. The nameplate for the entrance door air dump valve shall say: “Emergency Only – To manually open entrance door push knob.” All references shall detail the “manual” operation of the door.

H.64. WINDSHIELD WIPERS AND WASHERS

H.64.1. WINDSHIELD WIPERS

H.64.1.1. The coach shall be equipped with three speed electric windshield wipers for each half of the windshield. Both wipers shall park along the center vertical edges of the windshield glass. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service from outside the coach only and shall be removable as complete units. Mounting shall preclude cracking or damage to the windshield frame. Power supply to the wiper motors shall be provided through a dedicated circuit.

H.64.1.2. An intermittent operation feature for each wiper shall be provided with a variable time delay. After each pause, the wiper shall make one complete cycle across the windshield surface and return to the park position automatically.
H.65. WINDSHIELD WASHERS

H.65.1. 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. Two separate washer pumps are to be provided.

H.65.2. The windshield washer system shall have a 3.9 gallon (15 liter) translucent reservoir, located for easy refilling. Reservoir pumps, lines and fittings shall be corrosion-resistant, and the reservoir itself shall be translucent for easy determination of fluid level. The windshield washer system shall be protected with an anti-freeze washer solution to -20°F (-29°C), regardless of season of delivery. The protected solution shall be tinted to provide easy visual indication that anti-freeze is present.

H.66. LIGHTING, CONTROLS, INSTRUMENTS

H.66.1. EXTERIOR LIGHTING

H.66.1.1. All exterior lighting systems shall be nominal 12V or 24V. The use of LED lamp assemblies shall be maximized to the extent practicable. All exterior lighting fixtures shall be sealed to prevent entry and accumulation of moisture or dust and each lamp shall be replaceable in less than 5 minutes by a mechanic. Lamps, lenses and fixtures shall be interchangeable to the extent practicable, and fixtures shall be corrosion resistant with sockets to be brass or stainless steel or plastic housings. Lamps at the rear of the coach, except the license plate lamp, shall be visible from behind when the engine service doors are opened. Sockets shall comply with SAE Standard J576C.

H.66.1.2. Visual and audible warnings shall inform following vehicles or pedestrians of reverse operation. Visual reverse operation warning shall conform to SAE Standard J593. Audible reverse operation warning shall conform to SAE Recommended Practice J994-Type C or D. Daytime running lights are to be provided.

H.66.1.3. Two light installation housings shall be located on each side of the coach front containing a single round halogen headlamp, a round LED daytime running light inboard of each headlight and an amber clearance/turn signal light located outboard of each headlight.

H.66.1.4. Amber colored turn signal lamps shall be provided on both the front and rear of the coach. All lighting shall meet Federal standards (including amended 49 CFR Part 571 effective December 26, 1984). The front right lamp shall be near the front wheel well, above the rub rail line and no higher than the wheel well. The front left side lamp shall be located at the same height and forward position as the right. The side signal lamps shall be of the armor protected type with unobstructed amber lens. The rear side signal lamps shall be generally located in the vicinity of the rear wheel well and shall have amber lenses.

H.66.1.5. LED roof marker lamps shall be provided at each end of the coach with amber front and red rear lens being provided. Intermediate LED marker lamps with amber lenses shall be provided on each side of the roof line at the center of coach.

H.66.1.6. Reflectors on the sides and rear of coach shall be provided. The front and center side reflectors shall be amber. The rear side and rear reflectors shall be red. The reflectors shall be permanently affixed to the coach; glue on or pressure sensitive mountings are not acceptable.

H.67. SERVICE AREA LIGHTING

H.67.1. Four lamps shall be provided in the engine compartment to generally illuminate the area for night emergency repairs or adjustments. The lamps shall be controlled by a switch located near the rear start controls in the engine compartment. These lamp assemblies shall be adequately sealed to prevent the intrusion of moisture or debris during coach operation or normal servicing operations such as steam cleaning. Necessary lights, also sealed, shall be located in other service compartments, and shall be provided with maintain contact switches on the light fixture or convenient to the light.

H.68. FLUSH MOUNTED CURB LIGHTS

H.68.1. Flush-mounted curb lights shall be installed on the right hand curbside of the coach. One light shall be installed in the no.1 baggage bay door, two shall be installed on the wheelchair lift door and one shall be mounted in the right hand rear engine service door.

H.68.2. The curb lights shall illuminate the curbside area the coach when the entrance door is opened, activated through the door control relay.

H.68.3. The lights shall extinguish automatically approximately 10 seconds after closing the entrance door. The curb light in the no. 1 baggage bay door shall extinguish when the baggage bay door is opened.

H.69. DRIVER’S LIGHTING
H.69.1. The driver’s area shall have a lamp to provide general illumination of the driver’s area and shall illuminate the half of the steering wheel nearest to the driver. This lamp shall be controlled by a switch that is conveniently located for access by the driver.

H.70. PASSENGER INTERIOR LIGHTING

H.70.1. Indirect interior illumination of the coach shall be provided by a minimum total of twenty-one (21) fluorescent tubes controlled by a switch on the driver’s left hand control panel. Lighting intensity, measured at a vertical plane 24 inch (610 mm) above the seat cushion, shall be a minimum 15 foot-candles. LED lighting providing equivalent illumination may also be used.

H.70.2. All passenger seats except for center seat of rear cross seat shall have a flush mounted adjustable LED light. A minimum of 6 candlepower will be provided by each reading light cluster to insure adequate visibility with a button for passenger control. A switch to test the function of the reading lamps shall be provided and be labeled “Test.” This switch shall be wired so as to override the function of all passengers reading lamp switches and illuminate all reading lamps when it is moved to the test position.

H.70.3. A minimum of six blue LED aisle lights shall be provided on the underside of the street side passenger seats. These lamps shall be mounted in such a manner so as to prevent passengers from damaging the light’s when they are illuminated.

H.70.4. Additional general lighting required to illuminate the interior for passenger exits and shall be interlocked to activate only when the passenger door is opened.

H.70.5. A step well lighting system shall be wired to illuminate when the front door is opened. The system shall provide no less than 2 foot-candles of illumination of the step treads with the doors open. These lights shall not glare in the passengers’ eyes. Lamp fixtures shall be totally enclosed, splash-proof, designed to provide ease of cleaning as well as lamp and housing removal, and shall not be easily removable by passengers. Step well lamps shall be protected from damage caused by passengers kicking lenses or fixtures and shall not be a hazard to passengers.

H.70.6. Three lamps shall be provided; a dome at the top of the step well, one on each side of the step well with the bottom one to also provide illumination of the ground area located inside and above the entrance door.

H.71. DRIVER CONTROLS

H.71.1. All switches and controls necessary for the operation of the coach shall be conveniently located in the driver’s area and shall provide for ease of operation. Switches and controls shall be essentially within the hand reach envelope described in SAE Recommendation Practice, J287, Driver Hand Control Reach. Controls shall be located so that boarding passengers may not easily tamper with control settings.

H.71.3. The door control, kneel control, windshield wiper/washer controls, and run switch shall be in the most convenient driver locations. They shall be identifiable by shape, touch, and markings. The passenger entrance door shall be operated by a single control, conveniently located by the driver’s left hand on the control console. The location of this control shall be easily determined by position and touch.

H.71.4. All switches and controls shall be marked with easily read identifiers. All panel-mounted switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from the vestibule or the driver’s seat.

H.71.5. A momentary engine overrule switch shall be provided on the driver control console to permit the driver to move the coach off the road. All labeling of controls shall be permanent.

H.72. LEFT HAND CONTROL CONSOLE

H.72.1. A control console shall be located immediately to the driver’s left and directly under the driver’s window. The console shall house the rotary master/run control switch, outside mirror touchpad controls, engine override switch, auxiliary heater switch, hazard light switch, entrance door switch, kneeling switch, engine brake switch, passenger chime switch, and hazard switch. All switches shall be multiplexed and LED back-lit wherever possible.

H.73. TRANSMISSION SHIFT SELECTOR CONTROL

H.73.1. The Allison Transmission Gen IV shift selector control shall be located on the left hand control console. Shifting is totally automatic using the touch pad on the shift selector control module. Fault codes are also displayed on the shift selector to identify potential problems detected by the transmission’s built-in diagnostics.

H.74. ACCELERATOR, BRAKE PEDALS AND ENGINE CONTROLS
H.74.1. These controls shall be designed for ankle motion. Foot surfaces of the pedals shall be faced with wear-resistant, nonskid, replaceable material that is either slipped or glued for grip. Controls for engine operation shall be closely grouped within the driver’s compartment.

H.75. INSTRUMENTATION

H.75.1. The speedometer, air pressure gauge(s), and certain indicator lights shall be located on the front dash panel immediately ahead of the steering wheel. The steering wheel spokes or rim shall not obstruct the driver’s vision of the instruments when the steering wheel is in the straight-ahead position. Instrument panel gauges and switches shall be illuminated when the exterior marker lamps are turned on. 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.

H.75.2. Indicators/telltale immediately in front of the driver shall at a minimum include:

H.75.2.1. Headlamp High Beam
H.75.2.2. Right Turn
H.75.2.3. Left Turn
H.75.2.4. Hazard Warning
H.75.2.5. Parking Brake applied
H.75.2.6. Service Brakes applied (may be common with parking brake indicator – Tell Tale labeled “Stop Lights.”)

H.75.3. The instrument panel shall include a speedometer indicating no less than 80 mph (130 kph) and calibrated in maximum increments of 5 mph (5 kph). The speedometer shall be a rotating point type, with a dial deflection of 240° to 120° and 45 mph (73 kph) near the top of the dial. The speedometer shall be sized and accurate in accordance with SAE Recommended Practice J678. A programmable electronic speedometer, or approved equal with odometer indicating vehicle speed in miles per hour, between 0 mph and 80 mph, shall be supplied. Speedometer speed and odometer mileage readings must be accurate within limits of plus nothing to minus 2% when coaches are equipped with new tires. The speedometer shall be equipped with an odometer with a capacity reading no less than 999,999 miles or kilometers.

H.75.4. The instrument panel shall also include air brake reservoir pressure gauge(s) with indicators for front and rear air tanks and voltmeter(s) to indicate the operating voltage across the coach batteries. The instrument panel and wiring shall be easily accessible for service from the driver’s seat or top of the panel. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.

H.76. VISUAL AND AUDIBLE WARNING DISPLAY

H.76.1. Critical systems or components shall be monitored with a built-in diagnostic system. This diagnostic system shall have visual and audible indicators. The diagnostic indicator lamp panel shall be located in clear sight of the driver and shall incorporate LED telltale lights. 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. An audible alarm shall sound when certain malfunctions are detected by the diagnostic system. The audible alarm shall be loud enough for the driver to be aware of its operation. Malfunction warnings and other indicators listed in Figure 2 shall also be supplied on the coach. Space shall be provided in the telltale clusters for future additions of no less than 4 indicators as the capability of onboard diagnostic systems improves.

H.76.2. All diagnostic indicators shall be simultaneously tested by the activation of master switch.

H.76.3. FIGURE 2: Operator's Status Panel Indicators

<table>
<thead>
<tr>
<th>VISIBLE INDICATOR</th>
<th>TYPE of ALARM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
<td>Alarm Type</td>
</tr>
<tr>
<td>------------------------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>BACK-UP INDICATOR (A)</td>
<td>Back-Up Alarm</td>
</tr>
<tr>
<td>CHECK ENGINE INDICATOR</td>
<td>None</td>
</tr>
<tr>
<td>CHECK TRANSMISSION INDICATOR</td>
<td>None</td>
</tr>
<tr>
<td>ANTILOCK CONDITION LAMP</td>
<td>None</td>
</tr>
<tr>
<td>NOT GENERATING</td>
<td>None</td>
</tr>
<tr>
<td>HAZARD INDICATOR</td>
<td>Click</td>
</tr>
<tr>
<td>HEADLIGHT HIGH BEAM INDICATOR</td>
<td>None</td>
</tr>
<tr>
<td>HOT ENGINE INDICATOR (B)</td>
<td>Buzzer</td>
</tr>
<tr>
<td>KNEEL INDICATOR</td>
<td>Sonalert</td>
</tr>
<tr>
<td>LEFT TURN SIGNAL INDICATOR</td>
<td>Click</td>
</tr>
<tr>
<td>LOW AIR INDICATOR</td>
<td>Buzzer</td>
</tr>
<tr>
<td>LOW OIL PRESSURE INDICATOR (B)</td>
<td>Buzzer</td>
</tr>
<tr>
<td>LOW COOLANT INDICATOR (B)</td>
<td>None</td>
</tr>
<tr>
<td>PARKING BRAKE INDICATOR</td>
<td>None</td>
</tr>
<tr>
<td>RIGHT TURN SIGNAL INDICATOR</td>
<td>Click</td>
</tr>
<tr>
<td>STOP ENGINE INDICATOR</td>
<td>None</td>
</tr>
<tr>
<td>STOP REQUEST INDICATOR</td>
<td>Chime</td>
</tr>
<tr>
<td>WHEELCHAIR LIFT INDICATOR</td>
<td>Buzzer / Alarm</td>
</tr>
<tr>
<td>WHEELCHAIR STOP REQUEST INDICATOR</td>
<td>Chime</td>
</tr>
<tr>
<td>REAR RISE INDICATOR</td>
<td>Sonalert</td>
</tr>
</tbody>
</table>

**NOTE:**
(A) This indicator may be located on the transmission control panel.
(B) These indicators may be combined with the CHECK ENGINE indicator provided by engine manufacturer.
H.77. INTERIOR TRIM

H.77.1. GENERAL REQUIREMENTS

H.77.1.1. The interior trim shall be generally pleasing, 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. To the extent practicable, all interior surfaces more than 10 inches (254 mm) 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. Handholds, lamps, air vents, armrests, and other interior fittings shall appear to be part of the coach interior design. There shall be no sharp, abrasive edges and surfaces and no unnecessary hazardous protuberances. All plastic and synthetic materials used inside the coach shall be fire-resistant.

H.77.1.2. Materials shall be selected on the basis of maintenance, durability, appearance, flammability, and tactile qualities. Trim and attachment details shall be kept simple and unobtrusive. 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 under normal operational conditions.

H.78. TRIM PANELS

H.78.1. Interior side trim panels and driver's barrier shall be textured stainless steel, anodized aluminum, plastic, melamine type material, vinyl-clad aluminum or fiberglass reinforced plastic. The material shall permit easy removal of paint, greasy fingerprints, and ink from felt tip pens. Panels shall be easily replaceable and tamper resistant. They shall be reinforced, as necessary, to resist vandalism and other rigors of commuter coach service. Interior mullion trim, molding, and trim strips shall be textured stainless steel, vinyl-clad aluminum, anodized aluminum or vacuum formed plastic.

H.78.2. The lower sidewall interior trim shall be fabric covered aluminum panels or approved equal, with fabric patterns running horizontally. Panels shall be sectionalized for ease of repair and joined by aluminum extrusion. Ceiling panels shall be vinyl-clad aluminum or approved equal.

H.79. HEADLINING

H.79.1. 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 frame members. Molding and trim strips, as required to make the edges tamper-proof, shall be stainless steel, aluminum, or plastic, colored to compliment the ceiling material. The access panel for the antenna base does not require to be hinged but shall be mounted with tamper-proof screws. Materials for the headlining shall typically be vinyl clad aluminum; the front interior cap shall be gray fiberglass or ABS.

H.80. FRONT END

H.80.1. The entire front end of the coach shall be sealed to prevent debris accumulation behind the dash and to prevent the driver from kicking or fouling wiring and other equipment with his feet. The front end shall be free of protrusions that are hazardous to passengers standing or walking in the front of the coach during rapid decelerations. Formed metal dash panels shall be painted and finished to exterior quality or may be ABS, fiberglass or vinyl-clad. All parts forward of the driver's barrier shall be finished with a dull matte surface. Colors shall match or coordinate with the balance of the coach interior.

H.81. REAR END

H.81.1. The rear bulkhead and rear interior surfaces shall be paneled with fiberglass reinforced plastic, trimmed with stainless steel, aluminum, vinyl-clad aluminum, or approved equal.

H.82. PASSENGER SEATS

H.82.1. ARRANGEMENTS

H.82.1.1. Passenger seats shall be arranged in a transverse, forward facing configuration. Ambulatory passenger capacity shall accommodate 57 seats. An option for a lavatory shall be provided, the lavatory should not displace more than 2 passenger seats. Both configurations will need an attached floor plan.

H.82.1.2. No more than twelve seated positions shall be lost on any bus configuration to accommodate two wheelchair passengers occupying the securement positions.

H.82.1.3. Each transverse, forward facing seat, except the rear seats, shall accommodate two adult passengers. Floor seat tracks shall be stainless steel and shall be welded to the coach frame and be nearly flush with the finished floor. The wall tracks shall be stainless steel or aluminum and shall be bolted or riveted to the sidewall.

H.83. STRUCTURE AND DESIGN
H.83.1. Seats shall be American Seating Model W2005SQ reclining seats or approved equal. Seat frames shall be constructed of high strength, fatigue resistant, welded steel with a durable powder coated, corrosion resistant colored finish which complements the coach interior. The seat frame shall be wall mounted with heavy gauge steel brackets and shall be attached to the coach floor with a heavy duty stainless steel T pedestal. The seat back shall recline five (5) inches (127 mm) maximum with an infinite number of stops. The reclining seat backs shall be provided with a dress up feature to facilitate coach cleaning. Seat width shall be nominal 40.50 inches (1,029 mm). Aisle shall not be less than 14 inches (356 mm) wide.

H.83.2. Seat cushions shall be supported by steel serpentine springs. Seat covering shall be Holdsworth, Lantal, or similar high quality wool fabric. Typical seat covering weight shall be 24 ounces (680 g)/square yard. Overall composition shall typically be 54% wool, 9% nylon and 37% cotton. Pile composition shall typically be 85% wool and 15% nylon. Backing composition shall typically be 100% cotton. Abrasion from a 28 ounce (794 g) loading shall not affect appearance with 60,000 rubs. The front face of the seat upright and side boxing of cushions shall be covered with Holdsworth, Lantal or other similar wool fabric to compliment the seat cushion. Backrest fabric shall be rugged carpet material. Seat armrest shall be dark gray in color.

H.83.3. Seat foam padding shall be polyurethane. Seat upholstery shall utilize zippers or Velcro which allows them to be removed from the seat cushions for cleaning/replacement purposes.

**H.84. DRIVER’S SEAT**

**H.84.1. DIMENSIONS**

H.84.1.1. The driver’s seat shall be a Recaro Ergo Metro or approved equal. The driver’s seat shall be adjustable and shall have up to 9.05 inches (230 mm) of fore and aft adjustment. The seat back and cushion shall be adjustable. The seat shall have cushion depth adjustment, height adjustment (5.5 inches (140 mm) maximum), seat back adjustment, rear cushion adjustment and lumbar adjustment so that operators ranging in size from the 98th percentile male to the 5th percentile female may operate the coach. The back structure shall be constructed of steel and include a one piece stamped steel shell. The seat shall come equipped with an air track release and a manual center release. All controls are to be on the right-hand side of the seat.

H.84.1.2. A rubber boot shall be provided to cover the suspension to eliminate the potential for pinching. All air lines are to be 0.25 inch (6 mm) diameter and have a quick disconnect at the back of the seat.

H.84.1.3. The suspension shall have a minimum of 15 degrees of seat cushion tilt (rake adjustment). The rake adjustment shall be dual-sided and be accomplished without leaving the seat. The seat cushion shall adjust from 18-20 inches (457 – 508 mm) for varying size drivers. Double locking seat tracks with stainless steel bearings shall be provided. The seat tracks shall be located below the seat cushion and above the pneumatic suspension to enhance track durability and improve rearward travel. The seat shall come equipped with an air track release and a manual center release. All controls are to be on the right-hand side of the seat.

H.84.1.4. The seat shall be equipped with manual dual recliner gears. The seat back shall be adjustable with dual sided hand controls and include a 24.5 degree recline stop. Recline stop is to prevent the seat from interfering with the driver’s barrier. The seat back shall be infinitely adjustable from 90 to 114.5 degrees. The seat back shall come with a full protective plastic back shell.

H.84.1.5. The back structure shall be constructed of steel and include a one piece stamped steel shell. The seat back shall be ergonomically designed and adjustable to provide exactly the right support to match the S-shaped curve of the operators back. The seat back foam shall be fully supported, no wires or spring support is to be provided. Solid steel bolster adjustment supports are required to provide strong lateral supports. Lateral supports will help hold the driver in place and reduce muscle fatigue while driving.

H.84.1.6. The seat cushion shall be adjustable in length and rake to accommodate operators of various heights. The seat cushion shall have a two inch extension for taller operators. To accommodate shorter operators, the front of the seat cushion shall rake down and retrack.

H.84.1.7. A three cell air lumbar with right hand controls shall be provided for lower back support. Each air bag shall be individually controlled. Switch design and layout shall be positioned so that the operator can adjust without looking. A four way adjustable headrest with six position vertical adjustment shall be provided. The seat shall be provided with a two point 72 inch (1.8 m) seat belt that is stored in plastic anti-cinch automatic retractors mounted on the left side of the seat. The seat belt buckle shall be located on the right hand side of the seat for easy access.

**H.85. STRUCTURE AND DESIGN**

H.85.1. The driver’s seat cushion shall be made of polyurethane foam. The foam shall be constructed to provide lateral support to provide better operator stability in curves and turns. All exposed metal on the driver’s seat, including
the pedestal, shall be unpainted aluminum or stainless steel. Required seat belts shall be fastened to the seat so that the seat may be adjusted by the driver without resetting the seat belt. Seat belts shall be stored in automatic, inertia locking type retractors that do not tighten up during operation. The retractor shall be located to the left of the driver; the latch mechanism shall be located on the right. The seat belt shall be designed to allow the operator to "set" the tension on the belt. The belt shall be designed to not creep, making the belt tighter or loose. The seat belt shall be long enough to secure a 98% male driver.

H.85.2. Driver's seat covering weight shall be 24 ounces/square yard. Overall composition shall be 54% wool, 9% nylon and 37% cotton. Pile composition shall be 85% wool and 15% nylon. Back composition shall be 100% cotton. Seat cushions shall withstand 100,000 randomly positioned 3.50 inch (89 mm) drops of a squirming, 150 pound (68 kg), smooth surfaced, buttocks-shaped striker with only minimal wear on the seat covering.

H.86. FLOOR COVERING

H.86.1. VESTIBULE

H.86.1.1. The floor in the vestibule shall be covered with RCA flooring or approved equal. The floor covering shall remain effective in all weather conditions for a minimum of seven years. The floor covering as well as transitions of floor material to the main floor and to the step well area, shall be smooth and present no tripping hazards. The standee line shall be white and 2.0 inches (51 mm) wide and shall extend across the coach ramp aisle in line with the driver's barrier. The width of this line shall be uniform in width across its entire length. This line shall be white, same color as the edge of the steps. Color shall be consistent throughout the floor covering.

H.87. DRIVER'S COMPARTMENT

The floor in the driver's compartment shall be easily cleaned and shall be arranged to prevent debris accumul

H.88. PASSENGER AREA

H.88.1. The floor covering in the passenger area shall be the same material, dimensions and color specified for the vestibule. Flooring shall be installed to minimize the quantity of seams. A one-piece aisle center strip shall extend from the rear cross seat running between the rows of transverse seats to the edge of the center ramp. The ramp will include a separate piece of flooring with a standee line imbedded next to the driver's modesty panel. The floor under the seats shall closely fit to the sidewall panels.

H.89. WINDOWS

H.89.1. WINDSHIELD

H.89.1.1. The windshield shall be designed an installed to minimize external glare as well as reflections from inside the coach. When the coach is operated at night with the passenger interior lighting on, essentially no reflections shall be visible in the windshield immediately forward of the driver's barrier. Reflections in the remainder of the windshield shall be minimized, and no reflection of any part of the coach interior behind the driver's barrier shall be visible in the windshield.

H.89.1.2. The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded windshields shall not be used. The glazing material shall have single density tint.

H.90. DRIVER'S SIDE WINDOW

H.90.1. The driver's side window section shall be divided vertically and the rearward section shall slide fore and aft in tracks or channels designed to last the service life of the coach. The driver's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall be nominal 0.25 inch (6 mm) laminated, tempered glass with single density tint, the same as the windshield. The side window shall be rated AS-2.

H.91. PASSENGER SIDE WINDOWS

H.91.1. Eight large rectangular passenger side windows shall be provided on each side of the 45 foot coaches. The glazed panel outside dimension size will be 36.125 x 57.625 inch (918 x 1466.5 mm) x .188-inch (4.76-mm) thick. The windows will have a nominal 32 x 52-inch (813- x 1,321-mm) clear opening within the inner support frame structure. The side passenger windows will be single- glazed construction, hermetically sealed, AS-3 laminated float, 76% heat-absorbing laminated safety glass with light and solar transmittance of 24%. A painted aluminum sash molding will be installed along the bottom length of the passenger side windows.

H.91.2. All windows shall be top hinged with push out at the bottom, with the exception of the wheelchair lift door and lavatory windows which do not open. All top-hinged windows shall be emergency escape type and include a single motion release bar running the entire width of the window at the lower edge to permit emergency egress. Emergency operating instructions printed on metal plates shall be provided at each seat position for operating the push-out window.

H.92. INSULATION
H.92.3. The insulating materials may be of differing thicknesses and materials to achieve thermal insulating properties and low interior noise levels. These are described following:

H.92.3.1. Roof: 2.0 inch (51 mm) thick, compressed at installation, resin coated, medium density non-bagged fiberglass

H.92.3.2. Sidewall: Rigid molded polyurethane foam of varying thickness.

H.92.3.3. Driver’s area: Minimum 0.50 inch (13 mm), high-density fiberglass under the floor in the driver’s area.

H.92.3.4. Step well area: 1-inch thick urethane foam insulation with stretched polyester film to minimize interior temperature variances during severe external climatic conditions and for sound deadening.

H.92.3.5. Below windshield: 2.0 inch (51 mm) thick, high density fiberglass

H.92.3.6. Complete rear lounge seat area shall be heavily insulated with fiberglass blankets and sound-dampened panels for both noise and heat protection as follows:

H.92.3.7. Behind the rear cross-seat riser and rear cross seat back and cushion are a minimum total of 1.50 inch (38 mm) thick high-density fiberglass blankets.

H.92.3.8. An additional 0.625 inch (16 mm) fiberglass blanket is added behind the rear cross seat back to further impede engine noise propagation to coach interior.

H.92.3.9. Sound barrier with 0.250 inch (6 mm) urethane foam layered on either side of a 0.125 inch (3 mm) urethane elastomer loaded with barium sulfate.

H.92.3.10. Cover panel behind rear cross-seat is 1.0 inch (25.4 mm) thick foamed polyurethane with stretched polyester film facing.

H.92.3.11. Area behind and below this rear area is 2.0 inch (51 mm) medium density fiberglass with a 0.75 inch (19 mm) thick heavy density fiberglass batting cemented to the inner face of the fiberglass rear panel.

H.93. THERMAL INSULATION

H.93.1. The combination of inner and outer panels on the sides, roof, and ends of the coach, and insulating materials shall provide a thermal insulation sufficient to meet the interior temperature requirements. The coach body shall be thoroughly sealed so that drafts cannot be felt by the driver or passengers during normal operations with the passenger doors closed.

H.94. SOUND INSULATION

H.94.1. 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 coach shall have a sound level of 60 dBA or less at any point inside the coach. These conditions shall prevail with all openings, including doors and windows, closed and with the engine and accessories switched off.

H.94.2. Bus generated noise level experienced by a passenger at any seat location in the coach shall not exceed 80 dBA and the driver shall not experience a noise level of more than 70 dBA under the following test conditions. The coach 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 coach 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 coach path. During the test, the ambient noise level in the test area shall be at least 10 dB lower than the coach under test. Instrumentation and other general requirements shall conform to SAE Standard J366. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured.

H.95. REAR SEAT INSULATION

H.95.1. Special design consideration shall be given to insulation in the area above the engine compartment. Fiberglass or other suitable material shall be applied, together with adequate ventilation, to provide temperatures consistent with the remainder of the coach.

H.95.2. Seat cushions and seat backs shall be suitably insulated to prevent elevated temperature of the seat itself and no cushion or back shall be measurably hotter as compared to any other seat in the coach.

H.96. ANCILLARY FEATURES

H.96.1. DRIVER’S AREA

H.96.2. VISORS

OMES/PURCHASING
H.96.2.1. Three roller type sunscreens shall be provided at the right and left hand windshield and at the driver's side window. Guide rods shall be located at each end of each screen to allow for infinite positioning. The sunscreens shall be shaped to minimize light leakage between the sunshades and windshield pillars. The sunscreens shall not obstruct air flow from the climate control system or obstruct the operation of other equipment such as the radio handset or the destination sign control. Sunscreen adjustments shall be made easily by hand.

H.97. STOP REQUEST SIGN

H.97.1. A passenger chime signal audible to the driver and to passengers anywhere inside the coach shall be provided. The chime shall be a push button convenient to seated passengers. A driver-controlled switch shall deactivate the chime system. A stop request sign shall be located in the front center of the coach and fastened to the coach ceiling to permit viewing by all passengers. The sign shall be illuminated when the passenger chime sounds and go off when the entrance door is opened. The passenger chime shall sound once when the sign's light comes on but will not sound again until after the system has been reset by the opening of the entrance door. A passenger chime circuit ON / OFF switch shall be provided in the driver's area.

H.98. DRIVERS STORAGE

H.98.1. A hook shall be provided for the drivers’ coat in the driver's area.

H.99. MIRRORS

H.99.1. OUTSIDE MIRRORS

H.99.1.1. The coach shall be equipped with corrosion resistant, heated remote controlled outside rear view mirrors, on each side of the coach. The mirrors shall be mounted so as to permit the driver to view the highway along both sides of the coach, including the rear wheels. Mirrors shall be firmly attached to the coach to prevent vibration and loss of adjustment, but not so firmly attached that the coach or its structure is damaged when the mirror is struck in an accident. Outboard maximum overall mirror width dimension shall not exceed 122 inches while providing maximum visibility to the operator.

H.99.1.2. The roadside mirror shall be a corrosion-resistant, remote outside rear view mirror, adjustable from the driver's seat. Mirrors shall be split view flat and convex glass integrated in the same housing, overall measurement 10 inches by 13 inches (254 x 330 mm). Mirrors shall permit operator view of road surface as well as the rear wheels. Connections on mirror harness shall be Cannon Sure Seal all weather connectors or approved equal. Mirror head shall be attached to arm with ball/collet adjustment, for positive head location. Mirror arm shall be made to breakaway if struck in an accident or to eliminate damage in bus wash. Mirror arm shall be hollow aluminum for concealing wire.

H.99.1.3. The curbside mirror shall be a corrosion-resistant remote outside rear view mirror. Mirrors shall be integral flat and convex with overall measurements of 10 inches by 13 inches (254 x 330 mm) and permit driver view of roadway as well as coach rear wheels. Mirror arm shall be spring loaded to break away, should impact occur. Mirror arm shall be made to break away if struck in an accident or to eliminate damage in bus wash. Mirror arm shall be hollow aluminum for concealing wire. A mechanical stop shall be provided which prevents contact between the mirror arm and the entrance door. Mirror arm shall also have a five inch convex spot mounted on it to provide a clear view of the front of the coach.

H.99.1.4. Both mirrors in both housings shall be heated. A switch shall be provided. The switch shall control both mirrors and be provided with pigtail connectors to interface with the wiring harnesses of both remote mirrors. The switch shall be installed in a location that is within easy reach of the operator.

H.100. INSIDE MIRRORS

H.100.1. A mirror shall be provided for the operator to observe passengers throughout the coach 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 rear of the coach and anywhere in the aisle. Inside mirror shall be 6.0 inches x 10.50 inches mounted just below the destination sign box and above the driver’s line of sight.

H.101. PASSENGER ASSISTS

H.101.1. GENERAL REQUIREMENTS

H.101.1.1. Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for the support and stability 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 coach, a horizontal assist shall be provided at the aisle side of the luggage rack that runs the full length of the luggage rack so that a 5th-percentile female passenger may easily move the length of the aisle using one hand and then the other without losing support. Excluding those mounted on the luggage racks, the assists shall be between 1.25 and 1.50 inches (32 x 38 mm) in diameter or width with radii no less than 0.25 inches (6 mm). All passenger
assists except for the luggage rack nosing shall permit full hand grip with no less than 1.50 inches of knuckle clearance around the assist.

H.102. FRONT DOORWAY

H.102.1. Front doors, or the entry area, shall be fitted with assists no less than 0.75 inches (19 mm) in width. Assists shall be as far outward as practicable, but shall be no further than 6 inches (152 mm) from the outside edge of lower step tread 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 on the front modesty panel.

H.103. VESTIBULE

H.103.1. The aisle of the driver's barrier panel shall be fitted with vertical passenger assists that are functionally continuous with the overhead assists that extend to within 36 inches (91 cm) of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm and shall be in complete compliance with ADA requirements.

H.103.2. A horizontal passenger assist shall be located in the front of the coach adjacent to the driver's area. The horizontal passenger assist maximum will be no more than 35 inches (89 cm).

H.103.3. The assists at the front of the coach shall be arranged to permit a 5th percentile female passenger to easily reach from the front door assist to the horizontal assist, then to the vertical assist.

H.104. PASSENGER INFORMATION SYSTEMS

H.104.1. DESTINATION SIGNS

H.104.2. The displays shall consist of Full Colored LED's. All Full Color LED's used for the destination signs shall be rated for a 50,000-hours. The entire display area of all signs shall be clearly visible and readable both in direct sunlight and at night with a viewing angle of at least 140 degrees. The characters formed by the LED’s shall meet the requirements of the Americans with Disabilities ACT (ADA) of 1990 Reference 49 CFR Section 38.39. The software will give the end user the capability to select from a vast selection of custom fonts, pre-programmed fonts and the Microsoft TrueType Directory fonts for display on the LED Signs for the most customization possible to the desire of the end user's riding public.

H.104.3. All destination signs shall be supplied with an ambient light detection sensor that controls the LED intensity according to the exterior light conditions. This adjustment shall be continuously linear, not stepped, from 10-100% output.

H.105. FRONT DESTINATION SIGN

H.105.1. 160 Columns by 17 rows, Front Sign shall consist of a matrix of 160 Columns by 17 Rows and should have no less than 2720 LED’s, with a maximum display height of not less than 8.75" and at least 64.75" wide. The outer housing should fit within an envelope of no more than 66 x 10.75 x 2". The sign should be readable from at least 250’ with a viewing angle of not less than 140˚.

H.106. CURB SIDE DESTINATION SIGN

H.106.1. Not required

H.107. SYSTEM CONTROL AND PROGRAMMING

H.107.1. All system control and drive PC boards shall be enclosed in either the sign housings or in the System Control Console. The various destination signs can be programmed to display either one common message or each sign can display an independent message. The System Control Console shall incorporate a flexible keypad with no moving parts.

H.107.2. The system control console shall be used to view display messages and contain the destination sign database. The driver console shall utilize a tactile membrane keypad. The system control console shall be equipped with an LCD display.

H.107.3. Sign system shall be capable of sequentially displaying a minimum of one pre-selected destination message and one public relations message. The operator shall be able to quickly change between pre-selected destination messages without re-entering a message code. Public relations messages shall be capable of being displayed alternately with the regular destination.

H.107.4. The Master Coach Run Switch shall control power to the sign system. 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 a bus environment.

H.107.5. The system control console shall be used to view and update display messages. The system control console shall utilize a multiple function keyboard with tactile feel, designed especially for the harsh transit environment. The system control console shall contain an LCD display. The system control console shall continuously display the
complete message associated with the selected destination code. Diagnostics and/or maintenance and test features that indicate any sign defects shall be included.

H.107.6. The system shall be capable of integrating to on-board computer devices for message listing program via anyone of several possible protocols, including but not limited to J1708, RS485, RS232, RS422 or IBIS. The sign system shall be capable of wireless upload capability for receiving the messaging database. The sign system shall be reprogrammable through the system control console by either a standard USB Thumb Drive or via a 9-pin “D” type keyfob memory device.

H.108. EMERGENCY MESSAGE DISPLAY

H.108.1. A pre-programmed emergency message may be activated using a customer-selected switch located in the driver area. This message shall be displayed on signs facing outside the vehicle, while signs inside the vehicle, including the driver console, remain unchanged. Removing the emergency signal or entering a new destination shall cancel this message.

H.109. SYSTEM LEVEL DIAGNOSTICS

H.109.1. The system control console shall provide, at a minimum, visual indication of system level errors with the destination signs. This shall include detection of communication failure, power supply failure on a particular sign and display board failure on a particular sign.

H.110. PROGRAMMING

H.110.1. A PC-based software package will be furnished for creating the destination sign messages. The character shape and size shall be programmable and the software should allow the creation of personalized fonts. These may vary in pixel height and comprise single, double and triple stroke typeface. The program will allow an unlimited amount of special characters, logos or fonts to be displayed.

H.110.2. A programming software package shall be furnished to generate message lists for the destination sign system. It shall be a Windows compatible software package, using drop down menus and help screens. The software shall not require a standalone computer or a computer of a specific make or model. The software will allow, at a minimum, individual font selection, shape and choice of fonts, font creation and import, destination display management (right or left route numbers, pre-defined text fields, alternating screens and scrolling), as well as full system previews available for all signs. The software shall also offer utilization of the TrueType font directory for programming. Graphic capabilities are available to allow personal logo creation as well as selection from pre-programmed pictograms.

H.110.3. The programming software shall use techniques that require minimal operator training and are intended for use by operators that are not trained in complex computer operations.

H.111. WARRANTY & SPARES

H.111.1. All full color signs and components of the sign system shall be covered by a 5-year warranty. Free spare parts, (whole components), shall be provided to the end user free of charge for storage and use at the end users selected facility. The number of spares to be provided will be commensurate with the number of original systems purchased and shall be agreed to by all parties at the execution of a contract.

H.112. LIFT

H.112.1. A Braun model number NUVL855RM24 dedicated access extended travel lift, or approved equal with two forward facing mobility device securement areas to accommodate a maximum 30.0 inches (762 mm) wide mobility device shall be provided. The lift assembly shall comply with all current ADA and FMVSS 403 and 404 requirements. The lift shall be installed below the floor line at the number 2 right-hand luggage bay on the curbside of the coach.

H.112.2. The lift shall be controlled by a dash mounted toggle switch and a rear lift area toggle switch, and operated by up/down switches on a pendant mounted to the lift support bracket inside the number 2 baggage bay. The lift Restraint Belt must be buckled before the lift can be raised or lowered. The safety interlock circuit can be energized to operate the lift only if: the transmission is in neutral, the park brake is applied, engine Fast Idle is ON, the dash-mounted Master Switch is ON, the lift Secondary Switch is ON and the lift restraint belt is buckled.

H.112.3. The wheelchair loading system shall provide safe, comfortable and rapid ingress and egress for applicable passengers from the street level or a curb. When not in use, the lift shall stow in the luggage bay. The lift mechanism shall include a Threshold Warning device to provide “passenger on platform” information and prevent stowing the lift platform when a passenger is sensed. The outer barrier shall be automatically controlled and shall be such that it cannot be overridden by the loading system operator. A dash mounted indicator light shall be provided and shall be illuminated when the loading system is activated. The interlock shall apply, the bus shall not move and the engine throttle shall be disabled whenever the wheelchair loading system is activated. If the lift door is open or ajar, the interlock shall remain engaged. Brackets, clamps, screw heads and other fasteners used on the passenger assists shall be anodized aluminum or stainless steel and shall be flush with the surface and free of rough edges.
H.112.4. The lift control mounted on the lift structure shall have push button Up / Down switches. The toggle electrical supply switch shall be located in close proximity to the controller. This toggle switch must be turned "ON" prior to the lift operation. All lift control switches shall be permanently labeled. Decals shall not be permitted. The stow guard switch shall be red in color and the Stow / Deploy switch shall be black in color. These switches shall be incorporated in a hand held pendant.

H.112.5. The Braun NUVL855RM24 or approved equal lift shall include the following specifications:

- Lifting capacity (main platform) - 700 pounds (317 kg)
- Vertical travel - 63" (1,600 mm) maximum
- Platform width (chair capacity) - 30" (762 mm) minimum
- Platform depth (chair capacity) - 48" (1,219.2 mm) minimum
- Platform side height - 1.50" (38 mm)
- Handrail height - two (2) - 30" (762 mm) minimum
- Cassette stowed dimension (depth) - 72.25" (1,835 mm) total
- Cassette Width & Height - 43.5" x 8.375" (1,105 x 213 mm)
- Operating controls - 3 pushbutton
- Power Source - Electro- hydraulic
- Voltage - 24 volts
- DC Back up system - Emergency hand pump
- Construction - Steel and aluminum
- Stow level to ground cycle time - 12 seconds at 70 degrees (21° C) no load
- Ground to floor level cycle time - 12 seconds at 70 degrees (21° C) – no load
- Hydraulic system fluid capacity - 1.0 quart (1 liter)
- Hydraulic system operating pressure - 2500 psi (17,238 kPa) minimum


H.113.1. The lift shall include a hinged platform to bridge the coach floor to the lift platform. Bridge shall be hinged and locked in an upward position to act as a barrier when the lift is in use. Bridge shall also allow the lift passenger to ingress/egress easily from the platform. Lift travel speeds and lift operation shall be adjusted to the lift manufacturer's specifications upon completion of the lift installation into each coach and before coach delivery. The individual handrails shall incorporate a visual aid to insure that they are folded in the proper order.

H.113.2. The lift shall include an emergency system in case of driver operation malfunction. Should an emergency situation occur, the lift operator shall release the pushbutton switch on the controller to immediately stop the lift operation. Loss of electrical power shall also stop the lift operation regardless of switch position. An emergency auxiliary hydraulic hand pump shall be used to complete the lift cycle. The emergency hand pump handles and pump shall be located in an enclosed box at the rear wall of the number 1 right-hand baggage bay to prevent the accumulation of dust and dirt. The pump shall be easily accessible through baggage bay door. The handle shall be stored adjacent to the pump to allow immediate usage.

H.114. LIFT DOOR

H.114.1. The lift door shall be a single leaf design that operates in a sliding track mounted both above and below the door leaf. The door shall open by sliding to the rear of the coach and shall remain on a horizontal plane throughout the opening and closing process. No pin hinged doors shall be provided. The transmission must be in neutral and the parking brake activated for the lift to operate. The accelerator shall be automatically disabled and the fast idle system activated when either the lift master switch is turned "ON" or the lift door is open in order to provide maximum safety and security. These features shall be wired to the lift master switch to allow activation only when the transmission is in neutral. The coach directional (Hazard) lights will also flash on/off. After the lift operation is completed, the lift shall be properly stored and secured, with the access door closed and the lift master switch at the dash in the "OFF" position in order to move the coach.

H.114.2. The lift door shall have a window in line with the other passenger windows and shall not detract from the appearance of the coach. The door latch mechanism shall be located in the lower section of the door so that operators in the 5th percentile female range can operate the lift door.

H.114.3. The lift storage door shall not block the visual observation of the lift assembly while utilizing the manual override mode of the lift. A lift door design consisting of a horizontally hinged lift platform egress door mounted within a vertical motion pantograph baggage door is a preferred design.
H.115. LIFT INSTALLATION

H.115.1. The installation of the lift to the coach structure as well as the installation of the lift door into the sidewall of the coach shall not affect the structural integrity of the coach.

H.115.2. The parcel rack module above the wheelchair lift platform area shall be permanently removed to provide additional headroom. The modified rack shall be professionally finished at all ends.

H.115.3. A Threshold Warning module with a red warning light and acoustic sensor shall be mounted in the ceiling structure above the wheelchair lift entrance doorway.

H.115.4. The heating and air ducts shall be rerouted around the lift area to ensure proper interior air conditioning/heating airflow and distribution.

H.115.5. A passenger chime tape switch shall be mounted on the sidewall at the two (2) wheelchair securement positions.

H.115.6. Each coach shall have adequate information decals installed which details the proper lift operation in both the normal and manual modes of operation.

H.116. LIGHTING REQUIREMENTS

H.116.1. Lighting for the lift areas shall be designed to exceed ADA and FMVSS 404 standards. Lighting shall be provided to effectively illuminate the lift area. Light shall be wired through the lift master toggle switch on the driver's dash and shall automatically illuminate when this switch is in the "ON" position. The lighting design shall minimize the effect of glare on passengers entering the bus through the wheelchair lift door. During lift operation, the street surface shall be illuminated to a minimum of six candlepower a distance of 3 feet (.91 cm) beyond the external dimensions of the lift platform once deployed and lowered. Additional lighting shall be provided to insure illumination of the instruction placard and the manual override pump when it is in use.

H.117. SECUREMENT SYSTEM

H.117.1. The vehicle interior shall permit the securement of two (2) forward facing wheelchair passengers in which the primary position shall be on the street side of coach directly across from lift. Securement areas shall be a minimum 30 x 48 inches (762 x 1,219 mm) as required by ADA. Securement devices shall be QRT Deluxe Slide and Click or approved equivalent.

H.117.2. A separate three-point belt securement shall be provided to effectively secure wheelchair passengers.

H.117.3. To further secure the passenger during the lift operation, a retractable seat belt strap shall be provided at the ingress / egress area of the lift platform. This seat belt strap must be buckled to disengage the lift electrical interlocks to allow lift operation. A minimum 10.5 inches (267mm) high barrier shall also be provided at the rear of lift area for additional passenger protection.

H.118. ROOF VENTILATORS/ESCAPE HATCHES

H.118.1. Two roof ventilators shall be provided and designed to perform as escape hatches. One ventilator/escape hatch shall be located in the roof at the front of the coach, another in the roof at the rear of the coach.

H.119. CHASSIS

H.119.1. PROPULSION SYSTEM

H.119.2. VEHICLE PERFORMANCE

H.119.3. POWER REQUIREMENTS

H.119.3.1. The propulsion system and drive train shall provide power to enable the coach to meet the defined acceleration, top speed, and gradability requirements. Sufficient excess power shall be available to operate all accessories without jeopardizing coach performance or safety parameters.

H.120. TOP SPEED

H.120.1. The coach shall be governed at 72 mph (116 kph) road speed, for emergency and passing maneuvers, on a straight, level road at SLW.

H.121. GRADABILITY

H.121.1. Gradability requirements shall be met on grades with a surface friction coefficient of 0.3 and above at SLW with all accessories operating. The standard configuration power plant shall enable the coach to maintain a speed of 44 mph (71 kph) on a 2-percent grade and 7 mph (11 kph) on a 16- percent grade.

H.122. ACCELERATION

H.122.1. Vehicle shall accelerate from 0 to 20 mph (0 – 32 kph) in nine seconds, with the coach at S.L.W.
H.123. OPERATING RANGE

H.123.1. The operating range of the coach run on the design operating profile shall be at least 400 miles (644 km) on a single fill-up of compressed natural gas fuel.

H.124. OPERATING PERFORMANCE

H.124.1. Speed, gradability, and acceleration performance requirements shall be met at, or corrected to, 85 degrees F (29º C), 29.00 inches (74 cm) Hg, dry air. Performance degradation at conditions other than the test standard shall not exceed 1 % for each 3 degrees F/C and 4 % for 1,000 feet (305 m) of altitude above the standard.

H.125. POWERPLANT MOUNTING AND ACCESSORIES

H.125.1. MOUNTING

H.125.1.1. The power plant shall be mounted in a compartment in the rear of the coach. All power plant mountings shall be mechanically isolated to minimize transfer of vibration to the body structure. Clamps required for securing or supporting lines shall be rubber or plastic coated and properly sized for the line being clamped.

H.126. SERVICE

H.126.1. 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. The power plant shall be mounted on a cradle which can be slid into and out of the coach. Two mechanics shall be able to remove, replace and prepare the engine and transmission assembly for service in less than 25 total combined man-hours.

H.126.2. The muffler, exhaust system, air cleaner, air compressor, starter, turbocharger, alternator, radiator, including charge air circuit, all accessories, and any other components requiring service or replacement shall be installed in or above the engine compartment.

H.126.3. The turbocharger, alternator, air compressor, and starter shall be replaceable without dismounting or removing other coach parts and without gaining access through the coach interior.

H.126.4. The cooling system filler caps shall be removable from the filler neck and be held closed with spring pressure or positive locks. The transmission filler tube shall employ a combination dipstick and cap and shall be the minimum length permissible to make fluid checking easier. All fluid fill locations shall be properly labeled to help ensure correct fluid is added and all shall be easily accessible with standard funnels, pour spouts, and automatic dispensing equipment. All lubricant sumps shall be fitted with drain plugs of a standard size except for the transmission which uses a recessed square socket type plug. The power plant shall be equipped with digital, computerized diagnostic capability using laptop or PC-based available diagnostic software for displaying engine and transmission data.

H.126.5. The engine and transmission shall be equipped with sufficient heavy-duty fluid 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. All filters shall be easily accessible and the filter bases shall be plumbed in a manner so as to assure correct reinstallation.

H.126.6. CNG fuel lines within the engine compartment shall be rigidly supported and shall be composed of stainless steel tubing where practicable. Flexible fluid lines shall be kept at a minimum and shall be as short as required. CNG fuel lines shall be routed or shielded so that failure of a line shall not allow CNG fuel to be released, spray, or drain onto any component operable above the auto-ignition temperature of natural gas.

H.126.7. Flexible lines shall be individually supported and shall not touch one another or any part of the coach.

H.127. AIR CLEANER

H.127.1. The air cleaner shall be a dry type, horizontally mounted. Airflow through the filter element shall be from the outside in. To service the filter shall take less than 5 minutes, disconnecting an engine air intake duct, air compressor intake duct, or filter housing shall not be necessary. The access cover of the air filter assembly shall be retained to the filter housing with a single wing nut. A Filter Minder air filter restriction indicator, part number 135501-00920, manufactured by Engineered Products Co. or approved equal, shall be provided and calibrated to 20 inches (51 cm) of water/vacuum.

H.128. ACCESSORIES

H.128.1. Powertrain accessories shall be unit mounted for quick removal and repair. These accessories shall be driven at speeds sufficient to assure adequate system performance during extended periods of operation. The power steering pump and air compressor shall be flange mounted and gear driven from engine. The power steering reservoir shall be remotely mounted to the bus chassis and shall not be mounted on the drivetrain. Alternators shall be Leece Neville or approved equal. Only the 24 volt alternators, A/C compressor and cooling system fans.
may employ belt drives. Tension on the belt driven A/C compressor shall be maintained by an automatic tensioner. The alternator and the fan drive shall be automatically tensioned as well.

**H.129. HYDRAULIC DRIVE**

**H.129.1.** Hydraulic system service tasks shall be minimized and scheduled not more frequently than scheduled tasks for other major coach systems. All elements of the hydraulic system shall be easily accessible for service or unit replacement. All lines shall be compatible with the hydraulic fluid and maximum pressures of the system. Flexible lines shall be minimized in quantity and length. Lines of the same size and with the same fittings as those on other piping systems of the coach, but not interchangeable, shall be tagged or marked for use on the hydraulic system only. Hydraulic lines shall be individually and rigidly supported to prevent chafing damage, fatigue failures, and tension strain on the lines and fitting. Hydraulically driven radiator and charge air cooler fan drive systems are not acceptable.

**H.129.2.** The hydraulic system shall be configured and/or shielded so that failure of any flexible line shall not allow hydraulic fluid to spray or drain onto any component operable above fluid auto-ignition temperature.

**H.130. POWERPLANT**

**H.130.1. CUMMINS ISX12 G ENGINE**

**H.130.1.1.** The Cummins ISX12 G 11.9 Liter (726.2 cu. In.) engine or approved equal will be four cycle, spark – ignited, inline 6-cylinder, turbocharged, CAC with an operating range of 1200 rpm to 2100 rpm. The engine power rating will be 400 HP (298 kW) with a Maximum Torque Curve of 1400 lb-ft (1966 Nm) at 1300 rpm. The engine will have a cylinder bore of 5.11 in (130 mm), a piston stroke of 5.91 in (150 mm). The air induction system will be air-to-air charge cooled for maximum efficiency and power. The ISX12 G engine meets the current EPA emission requirements.

**H.130.1.2.** The engine shall have Idle Control that manages idling time and improves fuel economy. The engine shall also have a starter Lockout system that provides additional engine/starter protection by preventing the starter to engage when the engine is running.

**H.130.1.3.** The engine will have built-in diagnostics to ensure that all components are operating properly. If a system component fails, the operator will be alerted to the condition via a dashboard mounted “Check Engine” and/or “Stop Engine” light. The Engine Protection system shall regulate engine rpm to reduce the risk of progressive damage when a severe fault code is logged.

**H.130.1.4.** The electronic hardware and software on the engine shall use a common architecture with all the latest diagnostics, maintenance monitoring and engine protection features with customer selectable shutdown.

**H.130.1.5.** The entire system shall be capable of communicating with the electronically controlled transmission. The primary objective of the system is to provide the capability for the electronic engine controls to reduce power by command of the transmission in the event of transmission malfunction (low oil level/pressure; coolant temperature; etc.).

**H.130.1.6.** The engine electronic control module shall be constructed as a weatherproof enclosure on the engine that is protected from the environment. Engine mounted components (excluding wiring connectors) may be exposed to steam cleaning and pressure washing.

**H.130.1.7.** The engine shall be outfitted with the Probalyzer, or approved equal, brass Mini-gauge plug to permit oil analysis sampling. The plug shall withstand 2200 psi (105 kPa) and contain triple seals to eliminate potential leakage. Each plug shall be tested individually for control against leakage. Location shall be accessible through the rear engine compartment access door, and be installed on a main or bypass filter oil line ahead of the filter.

**H.130.1.8.** The engine shall be equipped with fast idle (950 RPM) and be driver controlled. The devices shall activate only with the transmission is in neutral and parking brake applied. This device may be used to help meet the requirements of coach air conditioning cool down. The engine starter shall be protected by an interlock that prevents its engagement when the engine is running. The starter shall be prevented from engaging when the transmission selector is in any position other than neutral.

**H.131. COOLING SYSTEM**

**H.131.1.** The cooling system shall be sized to maintain fluids at safe, continuous operating temperatures during the most severe operations possible with the coach loaded to GVWR and with ambient temperatures up to 110 degrees F (43 C). Sufficient reserve capacity shall be provided by the cooling system to provide efficient cooling for the coolant and engine charge air in a degraded condition. Radiator(s) shall be Modine, or approved equal. Radiator(s), complete with charge air cooling circuit shall be provided, mounted above the engine compartment. The charge air cooler and the radiator shall be mounted at least 60 inches (1.50 m) above the road surface. The physical size and heat rejection capacity of the radiator along with the charge air cooling capacity shall be tested and approved by the engine manufacturer for this application. The radiator system shall be easily serviced.
through the rear doors. The radiator and charge air cooler shall not be stacked in front of one another. Door shall include hinges which hold the doors in the open position.

H.131.2. The charge air cooler (CAC) / radiator assembly shall be primarily of durable corrosion-resistant aluminum construction. Heat exchanger fin spacing shall not exceed 14 fins per inch. Necessary hoses shall be premium, silicone rubber type that are impervious to all coach fluids. All coolant hoses shall be secured with constant tension hose clamps. Fan speed shall be regulated to minimize fan noise. No heat producing components or climate control system components shall be mounted between the engine cooling air intake aperture and the heat exchangers. All cooling system fittings are to be cast iron, brass or copper.

H.131.3. A single fan, belt driven from the engine shall pull outside air through an exterior panel and across the radiator / charge air cooler at a minimum rate approved by the engine manufacturer for maximum cooling efficiency. Belt tension shall be maintained by an automatic belt tensioner to minimize belt slippage and ensure longer belt life. A Linnig fan clutch or approved equal shall control fan operation.

H.131.4. Radiator surge tank shall be made of heavy-duty steel. A sight glass to determine satisfactory engine coolant level shall be provided and shall be accessible by opening the radiator access doors. A spring-loaded radiator cap shall also be provided to safely release pressure or vacuum in the cooling system. An engine alarm system will be included in the engine electronic control. Cooling fan logic shall be controlled electronically through the engine control system. An automatic coolant recovery system will also be provided.

H.131.5. Engine thermostats shall be easily accessible for replacement. The engine cooling system shall be equipped with a properly sized or approved equal cooling system filter with a spin-on, disposable element. The engine coolant shall be extended life Power Cool Plus using Organic Acid Technology (OAT) or approved equal. Shutoff valves shall be provided on the coolant filter base which allows filter replacement without coolant loss. Quarter turn valves shall also be provided and installed in the entire cooling system which permits complete shutoff of both lines for the heating and defroster units.

H.131.6. All low points in the water-based cooling system shall be equipped with drain cocks. Air vent lines shall be fitted at high points in the cooling system. Oil and water temperature gauges will be provided in the engine compartment.

H.132. TRANSMISSION

H.132.1. The transmission shall be an Allison B500 six speed transmission, equipped with Allison Transmission Electronic Controls (Gen. IV) or approved equal. Maximum input horsepower shall be 550 horsepower. Maximum input torque capability shall be 1650 pound feet of torque. The transmission shall have a one stage, three element, polyphase torque converter and a lock up clutch with a torsional damper. The transmission shall be fully automatic with six forward gear ratios. Shift calibration shall be set so that shifts shall be smooth under all operating conditions. The transmission shall only have one maintenance dipstick, and no other secondary service lane dipsticks. The transmission will also include a Probalyzer, or approved equal, brass Mini-gauge plug to permit transmission fluid analysis sampling.

H.132.2. If an Allison B500 Gen IV transmission is equipped it shall be filled with synthetic transmission fluids that meet Allison TES-295 specification and have a TES-295 approval number and the Allison approval logo. Mobil Delvac Synthetic Automatic Transmission Fluid can be used or Allison TES-295 approved equals such as Castrol Transynd. Allison Transmission extended warranty plans require synthetic transmission fluids meeting the TES-295 specification with an approval number and the Allison approval logo to be used.

H.132.3. The gearing shall be of the constant mesh, helical, planetary type with the following ratios:

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H.132.4. A function of the electronic controls shall be provided to prevent premature engagement and operation of the automatic transmission reverse gear.

H.132.5. The transmission shall be governed by electronic controls, which contain a programmable read-only memory (PROM) that will provide basic transmission control functions. All cabling and electronic devices utilized by the electronic transmission control system shall be adequately shielded against interference.

H.132.6. The transmission electronic module shall be capable of communicating with the engine electronic module to maintain maximum efficiency. The control module shall be equipped with a self- diagnostic system. A failure shall
be retained by the control module for evaluation by garage personnel using a Allison DOC software and J1939 / RS232 translation device or approved equal.

H.132.7. Modified diagnostics shall provide timely information on transmission oil and filter change requirements and transmission rebuild timeframes.

H.132.8. The electronic controls shall be completely sealed from the environment. The transmission electronic control unit shall be located in a weatherproof box that is protected from environment or potential damage from under floor baggage.

H.133. ELECTRIC STARTER

H.133.1. A Mitsubishi 105P70 24 volt starter motor, or approved equal shall be provided as a basic installation. Planetary gear reduction drive technology produces greater starting torque, rotating the armature at a higher rpm. The starter will have “Soft Start” positive pinion gear meshing technology, which will engage the pinion gear into the ring-gear before the starter begins to turn. The starting system shall be inoperable whenever the master control is in the OFF position, and whenever the emergency shut-off switch is activated or the engine is running. A starter interlock shall be provided that shall prevent the starter motor from engaging the flywheel after the engine is started.

H.134. ALTERNATOR

H.134.1. A 24-volt, 270 amp, brushless, oil-cooled, self-rectifying alternator will be mounted on the engine at the curbside of the coach. The alternator will be belt-driven off an engine-mounted accessory drive pulley. An automatic tensioner will maintain the required belt tension adjustment.

H.134.2. Alternator output at various engine speeds will be: idle (700 rpm) - 210 amperes, fast idle (950 rpm) - 240 amperes, full speed (2,100 rpm) - 270 amperes.

H.135. BOOST PUMP

H.135.1. A MP Boost Pump, or approved equal shall be provided as the basic coolant boost pump for coach heating requirements. The pump motor shall be a magnetic drive coupled pump operating at 24 volts DC. Coolant flow rate shall be a minimum of eight (8) gallons (30 liters) per minute. The pump operates on demand according to the driver’s heat control valve.

H.136. EMISSIONS

H.136.1. MOTOR VEHICLE POLLUTION REQUIREMENTS

H.136.2. The manufacturer shall provide in writing that:

H.136.2.1. The engine being provided complies with the Clean Air Act when operated on diesel fuel.

H.136.2.2. The horsepower of the vehicle is adequate for the speed, range and terrain in which it will be required to operate, and also to meet the demands of all auxiliary power equipment.

H.137. EXHAUST SYSTEM

H.137.1. A stainless steel exhaust system shall be provided. The system shall be located at the left hand (roadside) rear corner of the coach under structure and shall be accessed through the left rear service door. Exhaust piping shall not restrict underbody clearances. The muffler tailpipe shall direct exhaust gasses downward, toward the road surface and not up through a stack in the body of the coach.

H.137.2. The exhaust system shall include a DPF (Diesel Particulate Filter), designed to reduce particulate emissions. The DPF accumulates soot and residual engine oil, which are the product of combustion. A telltale light shall illuminate when the DPF needs cleaning. A “Regen” (Regeneration) switch located in the right rear corner service bay, accessed through the right rear corner service door, shall activate an internal element within the DPF that burns off the trapped soot and engine oil ash.

H.138. FINAL DRIVE

H.138.1. GENERAL REQUIREMENTS

H.138.1.1. The two rear axles shall have a load rating sufficient for the coach loaded to GVWR. Transfer of gear noise to the coach interior shall be minimized.

H.139. DRIVE AXLE

H.139.1. The drive axle shall be a Meritor World Axle or approved equal rated at 22,500 lbs (10,206 kg). The bearing journals on each spindle shall be induction hardened for greater durability. Ring gear shall be bolted to case. The drive axle hub end wheel bearings shall be oil lubricated. Default rear axle ratio shall be 3.73:1.

H.140. TAG AXLE
H.140.1. A tag axle shall be located behind the drive axle. The tag axle will be a solid beam type with fixed steering. The tag axle shall have single tires the same size as the tires on the front and drive axles. Tag axle weight shall not exceed 14,000 pounds. With full passenger seating capacity, load on any axle shall not exceed 22,400 pounds. Combined load capacity weight on the drive and tag axles shall not exceed 36,500 pounds.

H.140.2. A tag axle unloading feature will allow full or partial unloading, or dumping of air from the tag axle air spring bellows. This feature enables weight to shift to the drive axle for more traction. Manual unloading valves are located inside the RH rear curbside service door.

H.141. HUBS

H.141.1. The front and tag axle hubs shall feature unitized wheel ends (UWE) complete with factory pre-load bearing/hub assemblies, lubricant and seals.

H.141.2. The drive axle shall have nodular cast iron hub assemblies incorporating Pre-Set tapered roller bearings lubricated by differential oil at each axle end.

H.142. DRIVE SHAFT

H.142.1. The drive shaft shall be a minimum 3 inches (76 mm) outside diameter, heavy-duty type Meritor 1810 series or approved equal. The drive shaft shall be guarded to prevent it from striking the floor of the coach or the ground in the event of a tube or universal joint failure. U-joint end cap retaining bolts shall be retained by metal locking plates. Both half-round yoke ends shall be attached using self-locking bolts.

H.143. SUSPENSION

H.143.1. GENERAL REQUIREMENTS

H.143.1.1. The front and rear axle suspension shall be pneumatic and equipped with straight side lobe air suspension bellows. Four suspension bellows shall be provided on the drive axle and two suspension bellows on the front axle. The tag axle shall be equipped with two straight side lobe type air springs, 9.5 inch (241 mm) nominal in diameter. Pressure in the tag axle suspension shall be automatically adjusted as required by the load-sharing system. Manual air dump valves for unloading the tag axle air suspension bellows shall also be provided in the engine compartment.

H.143.1.2. The basic suspension system exclusive of bellows, height control valves, bushings and shock absorbers, shall last the life of the coach without major overhaul or replacement. Four (4) heavy-duty rubber bushed silent block sleeve type radius rods shall be provided at both the front and rear drive axles to control lateral, longitudinal, and torsional movement. Radius rod bushings shall be Clevite or approved equal. One transverse stabilizing rod shall be provided on front axle for additional support during coach lane changing or turning of corners. The coach shall be equipped with a sway bar designed to reduce body lean and increase bushing life. Items such as bushings and air springs shall be easily and quickly replaceable. 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.

H.144. SPRINGS AND SHOCK ABSORBERS

H.144.1. TRAVEL

H.144.1.1. The suspension system shall permit a minimum wheel travel of 3.5 inches (89 mm) in jounce and 3 inches (76 mm) in rebound. 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.

H.145. KNEELING

H.145.1. A driver-actuated kneeling device shall lower the coach floor 3.0 to 6.0 inches during loading or unloading operations regardless of load to a floor height of 42 inches (1.07 m) measured at the longitudinal centerline of the front door. The park brake shall prevent movement when the coach is kneedle. The coach shall kneel and rise at a maximum rate of 1.5 inches per second at essentially a constant rate. A flashing indicator visible to the driver shall be illuminated until the coach is raised to a height adequate for safe street travel. An audible warning device that operates with the kneeling system shall be provided. A visual indicator meeting ADA requirements shall be provided on the curbside of the coach and shall activate during the kneeling operation. This indicator shall be appropriately marked and visible to the boarding passenger.

H.146. DAMPING

H.146.1. 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. Damping shall be sufficient to control coach motion to 4 cycles or less after hitting road perturbations. Shock absorbers shall maintain their effectiveness for at least 50,000 miles (80,467 km) in normal service. The coach shall be equipped with four shock
absorbers on the drive axle and two on each side of the front axle and one on each end of the tag. Shock absorbers shall be interchangeable on each axle, side to side.

H.147. LUBRICATION

H.147.1. 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 coach 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 coach serviced by standard fittings. All fittings shall be standard pipe thread.

H.148. UNDERCOATING

H.148.1. Tectyl undercoating, or approved equal, shall be applied to the underside of the body, frame, and wheel wells. Undercoating overspray on the exterior of the coach shall be removed prior to delivery. Underbody components such as air suspension bellows and height control valves, shock absorbers, lubrication fittings, air brake system valves, brake lining, muffler and exhaust system components, drive shaft, and engine and transmission sumps shall be protected from undercoating overspray.

H.149. STEERING

H.149.1. STRENGTH

H.149.1.1. Fatigue life of all steering components shall exceed 1,000,000 miles (1,609,344 km). No element of the steering system shall fail before suspension system components when one of the tires strikes a severe road hazard. Inadvertent alterations of steering as a result of striking road hazards are steering failures. The steering column shall be manufactured by TRW or approved equal and shall provide both tilt and telescope features. The steering wheel shall be a wrapped, molded polypropylene. Finger grips shall be provided on the wheel, down and away from the driver. Steering systems that utilize an intermediate shaft to connect the main axle mounted steering box to the steering column shall utilize intermediate steering shafts manufactured by Dana Corporation or approved equal.

H.149.1.2. The front axle shall be rated at 16,000 pounds (7,257 kg) and shall be equipped with disc brakes and brake chambers with a load rating sufficient for the coach loaded to GVWR. Front axle shall be a standard, drop center type. Kingpins shall be the low friction, "Easy Steer" type for longer maintenance intervals.

H.150. TURNING EFFORT

H.150.1. The steering wheel shall be not less than 18 inches (457 mm) in diameter and shall be shaped for firm grip with comfort for long periods of time and shall not be padded. The steering wheel shall be removable with a standard or universal puller. 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 (13.6 Nm) with the front wheels straight ahead to turned 10 degrees. Steering torque may increase to 70-foot-pounds (95 Nm) when the wheels are approaching the steering stops. Steering effort shall be measured with the coach at SLW, 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 coach in operation, the steering effort shall not exceed 55 pounds (25 kg) at the steering wheel rim and perceived free play in the steering system shall not materially increase as a result of power assist failure.

H.150.2. 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.

H.151. BRAKES

H.151.1. SERVICE BRAKE

H.151.2. ACTUATION

H.151.2.1. Service brakes shall be controlled and actuated by an air system. Force to activate the brake pedal control shall be an essentially linear function of the coach deceleration rate. The angle of the pedal shall be ergonomically designed to minimize fatigue. At least 6.0 inches (152 mm) of slack in the airlines shall be available to allow for change out of the brake treadle valve and pedal assembly. The brake pedal shall be slightly higher than the accelerator. Provisions at the front shall be made to activate the brakes from the towing vehicle. Release of the emergency/parking brake shall require one full application of the service brake once the emergency/parking brake release valve is depressed.

H.152. FRICTION MATERIAL

H.152.1. Brake pads shall be non-asbestos, and must be designed and approved for use on the vehicle being proposed. Brake pads must provide optimum performance with the brake system being used and shall minimize brake noise under all weather conditions.
H.153. ANTILOCK BRAKE SYSTEM

H.153.1. The coach shall be equipped with a Meritor Wabco or approved equal antilock brake system or approved equal electronic controller assembly that will provide full vehicle wheel control braking for the coach. The system shall utilize an antilock brake system with disc brakes. The design of the digital electronics shall provide a high degree of protection from radio and electromagnetic interference.

H.153.2. The antilock brake system shall provide individual wheel control by using a wheel speed sensor and modulator at the front axle, drive axle and tag axle. The drive axle brakes shall be controlled completely independent of each other and therefore brake application pressure at an individual wheel shall be adjusted solely on the basis of its behavior on the road surface on which it is traveling. Wheel speed sensors shall be provided on the drive axle and will simultaneously control the wheels on the tag axle. A single modulator shall be provided that controls both rear curbside wheels and another modulator shall control the rear roadside wheels.

H.153.3. Inputs to the electronic control unit (ECU) equal shall be generated from a tone ring (exciter) by wheel sensors, which generate a signal, which varies in voltage and frequency as the speed of the wheel increases or decreases. The wheel sensor shall provide wheel speed information at the rate of 100 pulses per wheel revolution. The unit shall simultaneously receive, and individually interpret speed signals from four wheel sensors.

H.153.4. Outputs from the unit shall be provided to Meritor Wabco or approved equal brake modulator. The modulator shall be capable of receiving signals from the ECU, which shall be designed to modify operator applied air pressure to the service brakes. The modulator shall be located near the service actuator(s) it controls and shall be the last air valve through which air passes on its way to the brake actuator. A wiring harness shall connect each modulator to the ECU. Solenoid valves contained in the modulator shall provide the electrical interface between the controller electronics and the air brake system. The ECU shall be capable of simultaneously and independently controlling four individual modulator assemblies.

H.153.5. The antilock brake system logic shall be designed to respond to component equipment failure using a conservative fail safe philosophy. Any single electrical failure of a component devoted to antilock braking shall result in simultaneous illumination of the antilock condition lamp on the dash, a disabling of all or part of the antilock system, and reversion to standard braking on wheels no longer under the control of antilock. The ECU is divided into two separate parts, each equally controlling a pair of diagonal brakes. When a failure or damage occurs to one half of the ECU, ABS braking function shall be maintained in the wheels that are controlled by the working part of the ECU.

H.153.6. The wires that carry information and power into and out of the controller shall be terminated with a weatherproof connector with the wiring sealed to the connector with the exception of the ECU connectors. The wire gauge used shall be sized specifically for the task which it is designed to perform. A dashboard mounted antilock condition lamp shall be provided, which shall be controlled by the ECU via the multiplex system and shall serve as a means of providing the operator with the operating condition of the antilock brake system. All electrical connections on the antilock system shall be Meritor molded connectors, or approved equal. The ECU shall utilize 4 amp “JUNIOR-POWER-TIMER” series connectors, or approved equal.

H.153.7. The Data Link function shall be provided which enables the ECU to report its operating condition to an external source. The controller data link configuration shall conform to SAE standard J1708 and the coded language used shall conform to SAE J1587. Two connections in the controller shall be provided.

H.154. ELECTRONIC STABILITY CONTROL (ESC)

H.154.1. ESC (Electronic Stability Control) shall be integrated with the ABS braking system to provide improved vehicle stability. Sensors within the brake system monitor coach sideways movement and rotation, steering angle and brake application pressure to maintain coach directional stability.

H.154.2. The Electronic Control Unit (ECU) containing directional sensors shall be located in baggage compartment #3. A steering angle sensor shall be located in the steering column. These systems feed information that interacts with the ABS system providing directional and braking control.

H.154.3. The ESC/ATC telltale shall be located in the driver’s instrumentation and control center in the right hand telltale cluster. This telltale, along with the ABS telltale, monitors Electronic Stability Control (ESC) and Automatic Traction control (ATC) functions.

H.154.4. Automatic Traction Control (ATC) shall be integrated with the ESC (Electronic Stability Control) to improve traction on slippery surfaces by reducing drive wheel over-spin. ATC shall automatically switch ON and OFF as required by road conditions. If drive wheels spin during acceleration, the ATC telltale will come on, indicating ATC is active. It will go out when the drive wheels stop spinning and traction control is regained.

H.155. ATC MUD/SNOW FEATURE

H.155.1. ATC shall include a deep snow and mud feature. This function increases available traction on extra soft surfaces like snow, mud, or gravel by slightly increasing the permissible wheel spin.
H.155.2. The deep snow and mud feature is not automatic. A switch shall turn this function ON and OFF. While this feature is selected, the ESC/ ATC telltale blinks continuously. Once the feature is no longer required, the switch shall turn the deep snow and mud feature off and the telltale will extinguish.

H.156. AIR SYSTEM

H.156.1. The coach air system shall operate all accessories and the braking system with reserve capacity. The engine drive Wabco SS636 37.4 cfm air compressor, or approved equal shall be sized to charge the air system brake reservoir from 0 psi. to the governor cutoff pressure of 125 psi ± 2 psi (862 kPa ± 14 kPa) in less than 3 minutes while not exceeding the engine rated speed. The air compressor shall be set to cut in at 105 psi (724 kPa).

H.156.2. Regardless of the systems air pressure, idle up to the rated engine speed shall be available to the driver with the transmission in neutral and the parking brake applied.

H.156.3. With the air system fully charged and the engine shut off, the reservoir capacity shall be sufficient to permit four full brake applications to maintain 60 psig (414 kPa). The pressure relief valve shall be mounted in the compressor cylinder head. The muffler or ping tank shall be mounted in the engine compartment relative to the air compressor discharge port. A drain mounted on the muffler or ping tank shall be directed or piped so as to discharge below the engine cradle or bulkhead level.

H.156.4. Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J844-Type 1 or ASTM B-75 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844-Type 3B for nylon tubing or ASTM D-1248, Type 1, Class C Grade E5 for polyethylene tubing if not subject to temperatures over 200°F.

H.156.5. F. Accessory and other noncritical lines may use Type 3A tubing. Nylon tubing shall be installed in accordance with the following color coding standards:

H.156.6.1. HOSE COLOR AIR SYSTEM INSTALLATION

H.156.6.2. Green: Indicates primary brakes and supply

H.156.6.3. Red: Indicates secondary brakes

H.156.6.4. Brown: Indicates parking brake

H.156.6.5. Yellow: Indicates compressor governor signal

H.156.6.6. Black: Indicates accessories

H.156.6.7. Blue: Indicates suspension

H.156.7. Line supports shall prevent movement, flexing, tension strain, and vibration. Copper lines shall be supported by looms, grommets, or insulated clamps to prevent the lines from touching one another or any component of the coach. 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 consistent with standard automotive practice. Nylon lines may be grouped and shall be continuously supported.

H.156.8. The compressor discharge line between power plant and body mounted equipment shall be flexible extruded PTFE tube with stainless steel wire braid, Aeroquip 2807, or approved equal. Other lines necessary to maintain system reliability shall be flexible hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, reusable, 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 coach except for the supporting grommets. Flexible lines shall be supported at 2 foot intervals or less. Airlines shall be installed to minimize air leaks. Each coach shall not leak down more than 1.5 psi as indicated on the instrument panel mounted air gauges, within 15 minutes from the point of governor cut-off.

H.156.9. All reservoir supply and delivery airlines shall be sloped toward reservoirs and routed to prevent water traps. Grommets shall protect the airlines at all points where they pass through understructure components. Provision shall be made to apply shop air to a convenient location in the engine compartment and at the front of the coach and shall include a standard bore valve. The engine compartment valve shall be located ahead of a quarter turn valve. Air for the compressor shall be filtered through the main engine air cleaner system. All air reservoirs shall meet the requirements of SAE Standard J10 and shall be equipped with clean-out plugs and quarter-turn drain valves. These valves shall be protected from road hazards by major structural members. The air system shall be protected by a pressure relief valve set at 200 psi (1,379 kPa) at the air dryer and 150 psi (1,034 kPa) at the compressor. The air system shall also be equipped with check valves and pressure protection valves to assure partial operation in case of line failures.

H.156.10. The main airline check valve located between the air compressor and the first reservoir must be accessible for maintenance. Means shall be provided to establish the check valve to be in working order.
H.156.11. A Wabco SS1200 Plus or approved equal air dryer shall be provided and installed according to component manufacturer recommendations.

H.157. GENERAL CHASSIS

H.157.1. WHEELS AND TIRES

H.157.2. WHEELS

H.157.2.1. Hub-piloted 9” aluminum Alcoa or approved equal wheels shall be provided. 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. One spare wheel, complete with mounted tire shall be provided.

H.157.2.2. The wheel nuts shall meet all physical property requirements defined in ASTM A 194-2H, ISO and SAE standards. The nut shall be coated for corrosion resistance. The bench testing requirements for the lug nuts shall satisfy MIL-STD 1312 vibration test 7 and the Junkers dynamic test. Front and tag axle lugnuts shall be standard Meritor or approved equal components.

H.158. TIRES

H.158.1. The tires shall be supplied by the vehicle manufacturer. Tires, including spare, shall be Firestone FS-400, 315/80R-22.5, 20 ply, load range L or approved equal. Tires shall be suitable for the conditions of commuter service and sustained operation at the maximum speed capability of the coach. Load on any tire at GVWR shall not exceed tire supplier's rating. Tires shall provide the ride, noise, and handling characteristics associated with the demands of commuter service.

H.159. COMPRESSED NATURAL GAS FUEL SYSTEM

H.159.1. A compressed natural gas fuel system consisting of fuel cylinders, filler provisions, fuel lines, pressure reduction, and auxiliary equipment necessary to safety operate under all operating conditions to meet the performance requirements of this specification, shall be provided. The system shall be capable of refueling from 0 to 125 % of working pressure in a maximum of five minutes. Fitting used in the fuel system shall be Swagelok, or approved equal. The fuel system shall be compliant with NFPA-52 “Compressed Natural Gas Vehicular Fuel Systems” most recent edition, including amendments and all U.S. title 13 requirements applicable to CNG fueled vehicles.

H.160. PRESSURE REGULATORS

H.160.1. A primary fuel pressure regulator shall be supplied and mounted in an accessible location for servicing. Coolant lines shall be routed in a manner to prevent trapping air or draining coolant when the regulator is removed for service.

H.161. FUEL CYLINDERS

H.161.1. The fuel cylinders shall have a capacity to operate the bus for minimum range of 400 miles per fill-up when operated on FTA ADB duty cycle operating at 3600 psi working pressure. The fuel cylinders shall be mounted in such manner that replacement of one cylinder shall not require removal of additional cylinders. Fuel lines shall be routed to permit replacement of individual lines and fittings.

H.162. FUEL CYLINDER CONSTRUCTION

H.162.1. Fuel cylinder construction shall be in accordance with DOT Standard 304, ANSI NGV-2 design and test criteria. Cylinder shall be designed for lightest weight possible which does not require a hydrostatic requalification. Tanks shall be certified for refueling pressures to 125 percent of working pressure during temperature compensating fueling. A manual or electric solenoid shot off valve shall be installed on each individual fuel cylinder. Ends of the fuel cylinders shall have a protective shield surrounding the fittings and the valves.

H.163. SERVICE VALVES

H.163.1. A quarter turn valve shall be accessible through the fuel door which shall isolate the high pressure manifold and fuel storage system from the rest of the engine fuel system. The valve function and open and closed positions shall be clearly marked. An additional ½” valve shall be provided for draining the high pressure manifold and any fuel cylinder (s) through a service port. All fuel system service valves shall be accessible from the curbside of the coach.

H.164. FUEL PRESSURE GAGE

H.164.1. An oil filled gauge shall be located in the high pressure manifold which shall indicate fuel system pressure. The fuel gauge shall have minimum 100 psi increments with 0-5000 psi range and shall be visible during fueling operations. A pressure transducer shall be incorporated into the high pressure fuel manifold which shall provide the operators low fuel light indicator with an accurate fuel quantity dreading. The low fuel warning light shall be at approximately 500 psi.
H.165. FUEL FILLER ASSEMBLY

H.165.1. A single fuel filler receptacle shall be located on the right side of the bus, 15-20 feet behind the center line of the front door and 35 to 45 inches from the street surface. The filler receptacle shall be mounted so that its center line is between 5 and 25 degrees from horizontal (face of the receptacle pointing slightly up). The fill receptacle shall accept a Sherex CT-5000 nozzle or approved equal and shall incorporate a dust cap permanently affixed to the receptacle. The fuel fill access door shall incorporate a magnetic switch that will deactivate the engine starting system if the fuel door is open.

H.166. CNG DEFULING SYSTEM

H.166.1. The coach shall be capable of being defueled. The defueling system shall have the following characteristics as a minimum:

  H.166.1.1. Receptacle compatible with a “SHEREX CT 5000 series” nozzle.
  H.166.1.2. Receptacle dust cap tethered to prevent loss.
  H.166.1.3. Access shall be located on the curb side of the coach through the fuel access door.
  H.166.1.4. Explosion-proof interlock switch to prevent engine starting when access door is open.
  H.166.1.5. Decal on exterior of access door: CNG DEFULING RECEPTACLE Decal on interior of access door: CNG DEFULING RECEPTACLE BE SURE VEHICLE IS GROUNDED BEFORE DEFULING

H.166.2. A PRD vent line, manufactured from stainless steel and adequately sized to accommodate the total on board fuel capacity shall be installed and shall vent any natural gas release to the rear of the coach at the roof line.

H.167. BUMPERS

H.167.1. LOCATION

  H.167.1.1. Bumpers shall provide impact protection for the front and rear of the coach up to 26 inches above the ground. The bumpers shall wrap around the coach to the extent practicable without exceeding allowable coach width.

H.168. FRONT AND REAR BUMPERS

H.168.1. The front bumper assembly, nominally 20 inches (508 mm) high, shall consist of three energy absorbing modules that are self-restoring black urethane with minimum 1700 psi (11,721 kPa) tensile strength, 250 % elongation, and 350 psi (2,413 kPa) tear strength. The hollow ribbed black urethane cover will have excellent resistance to tears, abrasion, salt, hydro-carbons, detergents, sunlight, and will be repairable. An inner support structure constructed of aluminum or high strength steel shall provide a single, full length structural support for bumper the modules. The bumper assembly shall be hinged at the bottom for access to the spare tire, with the bumper release lever located at the top of the front roadside service compartment.

H.168.2. The rear bumper will be nominally 11 inches high (279 mm) consisting of a rigid steel and aluminum inner support structure with a repairable hollow ribbed black urethane cover. The bumper shall be shaped to wrap around the coach rear corners to protect the engine compartment doors and will also incorporate an anti-ride, or pinning feature to prevent unauthorized riders.

H.168.3. The complete assembly will be self-contained, self-restoring and maintenance-free.

H.169. ELECTRICAL SYSTEM

H.169.1. GENERAL REQUIREMENTS

  H.169.1.1. The basic coach electrical system shall utilize multiplexed Power Management Modules (PMMs) from Actia, or approved equal. Versatility and future expansion of the system shall be provided for by expandable system architecture. The system shall be SAE J1939 compatible. A gateway used to interface between different communications protocols shall be built directly into the PMMs.

  H.169.1.2. The system components shall be capable of reliable operation in an environment of between minus 30C to plus 80C while encountering mobile shock and vibration. Each module shall be adequately shielded to prevent interference by EMI. The multiplex power source shall be isolated, thereby minimizing any ground signal noise. A built in self-test system shall be utilized to check for module communication failures or output feedback problems within the system, and shall display faults on the LCD Diagnostic Interface

  H.169.1.3. The components of the multiplex system shall be of modular design thereby providing for ease of replacement by field maintenance personnel. Power management modules will have the ability be re-programmed from existing PMMs on the coach. Four PMMs shall be distributed throughout the coach
H.169.1.4. An optional 7” diagonal color LCD touch screen with 800 x 480 screen resolution shall be incorporated to provide system status and diagnostics.

H.169.1.5. Two Leece Neville 24 volt 140 amp alternators, or approved equal shall be provided. All circuits shall be protected by circuit breakers, fuses or solid state devices. Only the bus body and framing shall be used to attach ground studs. Grounds shall not be carried through hinges, bolted joints (except those specifically designed as electrical connectors), or power plant mountings. Wiring and electrical equipment necessarily located under the coach shall be insulated from water, heat, corrosion, and mechanical damage.

H.170. MODULAR DESIGN

H.170.1. 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 30 minutes by a mechanic. Power plant wiring shall be an independent wiring module. Replacement of the engine compartment wiring module(s) shall not require pulling wires through any bulkhead or removing any terminals from the wires.

H.171. JUNCTION BOXES

H.171.1. All relays, controllers, and other electrical components shall be 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. A rear start and run control box shall be mounted in an accessible location in the engine compartment. No electrical controls shall be located where spillover from the surge tank can wash over the electrical controls or enter junction boxes.

H.171.2. Care shall be taken to route electrical harnesses from junction boxes to facilitate troubleshooting and to reduce defects. Terminal strips not blocks shall be used to make connections. Wiring under the coach floor in the baggage area shall be routed in an enclosed trough.

H.172. WIRING AND TERMINALS

H.172.1. All wiring between major electrical components and terminations, except battery wiring, shall be waterproof, and shall meet specification requirements of SAE Recommended Practice J555 and J1128 Type GXL or TXL. All wiring harnesses manufactured for buses purchased under this contract shall be designed and manufactured for the operation of all sub components installed on the buses. Harnesses shall be properly designed and sized to the highest voltage wire in the harness.

H.172.2. All wiring shall be properly grouped, numbered, and color-coded full length. Numbering shall be stamped at least every two (2.0) inches (50.8 mm). Installation shall permit ease of replacement. All wiring harnesses over 5-feet (1.50 meters) long and containing at least five (5) wires shall include at least 2 or 10 percent excess wires whichever is greater for spares, excluding the battery cables. In addition, twelve (12) spare wires (excluding battery cables) shall be provided between the front and rear junction boxes. 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.

H.172.3. Wire insulation shall be maintained as close to the terminals as practicable. The requirements for double insulation shall be met by wrapping harnesses with plastic electrical tape or by sheathing all wires and harnesses with nonconductive, rigid or flexible conduit. Grommets of elastomeric materials shall be provided at points where wiring penetrates the metal structure. Wiring supports shall be nonconductive. Precautions shall be taken to avoid damage from heat, water, solvents, or chafing. Wiring length shall allow replacement of end terminals twice without pulling, stretching, or replacing the wire.

H.172.4. Except for those on large wires such as battery cables, terminals shall be crimped to the wiring. Terminals shall be full ring type or interlocking and corrosion-resistant. T-splices may be used when it is less than 25,000 circular mills of copper in cross-section: 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.

H.173. ELECTRICAL COMPONENTS

H.173.1. GENERAL REQUIREMENTS

H.173.1.1. All electrical components, including switches, relays, and circuit breakers, shall be heavy-duty designs. To the extent practicable, these components shall be designed to last the service life of the coach and shall be replaceable in less than twenty five (25) minutes by a mechanic. Sockets of plug-in components shall be polarized where required for proper function and the components shall be positively retained. Any manual reset circuit breakers critical to the operation of the coach shall be mounted in a location best...
suited to the application with visible indication of open circuits. The electric motor shall be heavy-duty either wound field type or permanent magnet, as listed below. Electric motors shall be located for easy replacement and except for the cranking motor the brushes shall be replaceable in less than fifteen (15) minutes without removing the motor. Provision shall be made to ensure that the lubrication line for alternator bearing is secured to prevent lubricant leaks.

H.173.1.2. SYSTEM MOTOR TYPE Main Evaporator........ Brushless DC
H.173.1.3. Condenser Motors........ Brushless DC
H.173.1.4. Driver's Heater and Defroster........ Permanent Magnet
H.173.1.5. Windshield Wiper Motor........ Permanent Magnet
H.173.1.6. Windshield Washer Motor........ Permanent Magnet

H.173.2. Dual electric horns shall be provided. Horns shall be positioned to be protected from road hazards and the elements. The horn trumpets shall be down turned to assure drainage of any moisture that may have entered.

H.174. BATTERIES

H.174.1. Batteries shall be easily accessible for inspection and serviceable only from outside the coach. Batteries shall be of premium construction and shall be fitted with threaded stud terminals. Batteries shall be 8D with 1350 cold cranking amp capacity with 450 CCA reserve minimum. Positive and negative terminals shall have different size studs, and the battery terminals and cables shall be arranged to prevent incorrect installation. Battery terminals shall be located for access in less than thirty (30) seconds with jumper cables. No less than two conventional lead-acid batteries conforming to SAE Standard J537-Type 20T8 shall be provided. Battery cables shall be flexible and sufficiently long to reach the batteries in extended positions without stretching or pulling on any connection and shall not lie on top of the batteries. Battery cables are black with red heat shrink on the end for 24V (+), blue heat shrink for 12V (+) and white heat shrink for ground (-). A slave connection to the batteries shall provide a direct connection to the batteries for jump starting.

H.175. MASTER BATTERY SWITCHES

H.175.1. A master battery switch shall be provided near the batteries to provide complete, simultaneous disconnecting of the batteries from all bus 12 & 24 volt electrical systems. The master switch shall be a “rotary” style switch. The master switch shall be located behind a dedicated access door and shall be accessible in less than ten (10) seconds for operation. The master switch shall be capable of carrying and interrupting the total circuit load. Opening the master switch with the engine operating shall not damage any component of the electrical system.

H.176. RADIO NOISE SUPPRESSION

H.176.1. 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 coach. Suppression shall be in accordance with SAE Practice J1708 and FCC standards.

H.177. INTERIOR CLIMATE CONTROL

H.177.1. CAPACITY AND PERFORMANCE

H.177.1.1. The climate control system shall be highly reliable since most failures are Class 2. Manually controlled shut-off valves shall be installed in the refrigerant lines before and after the filter dryer to allow isolation of the dryer for service. Manually controlled shut-off valves in the refrigerant lines shall allow isolation of the receiver and compressor for service. Self-sealing couplings or manual shut-off valves shall be used to break and seal the refrigerant lines during removal of major components such as the refrigerant compressor or condenser. Condenser and evaporator fans shall have a protective guard to prevent contact between mechanics and rotating fan blades. The appropriate safety warning labels shall be permanently affixed at this location.

H.177.1.2. Interior climate control system shall be provided and operate on refrigerant 134a. It shall maintain the interior of the coach at a level suitable for climate conditions found in the continental United States. The heating, ventilating, and cooling systems shall maintain an average passenger compartment temperature between 60°F (16°C) and 80°F (27°C) with a relative humidity of 50 percent or less. The system shall maintain these conditions in a ambient temperature range of 10°F to 100°F (12°C to 38°C), with a ambient humidity range of 5 to 100 percent while the coach is running. In ambient temperatures of 95°F to 115°F (35°C to 46°C) with relative humidity greater than 50 percent, the system shall maintain a temperature gradient of 20°F (7°C) while the coach is running. In ambient temperatures of 10°F to -10°F (12°C to -23°C), the average interior temperature shall not fall below 55°F (13°C) when the coach is running with no passengers.

H.177.1.3. The air conditioning (AC) compressor shall be a four cylinder, short stroke – 1.65 inch, 2.76 inch bore, 39.4 cubic inch (.65 liter) displacement with a 500 – 3500 RPM range MCI 003 (Bitzer 4NFC), or approved equal. The compressor head and body shall be of rust proof aluminum construction, providing a
light weight, compact and efficient unit. The connecting rods shall be of one piece construction for easy, long-life maintenance. Exchangeable cylinder liners shall be used in the cylinder bores for long service life and easy and efficient maintenance. The compressor shall be belt driven through a bi-directional & maintenance free magnetic clutch. Modern, environmentally friendly chlorine free refrigerants can be used with the compressor.

H.177.1.4. Compressor drive belts shall be manufactured from Kevlar® material to provide longer service life.

H.177.1.5. A manually adjustable belt tensioning device shall be provided to maintain proper belt tension.

H.177.1.6. The main air conditioning system capacity shall be at least 90,000 Btu’s/hr. (26,376 W) with R134a.

H.177.1.7. Driver's A/C capacity shall be at least 10,800 Btu’s/hr. (3,165 W).

H.177.1.8. The condenser fan motors with shrouded axial fans shall be brushless type with totally enclosed grease lubricated bearings. Motor shall be 24 volt, minimum 2 horsepower (1.5 kw) and operate only when the A/C is on for maximum efficiency. The condenser core shall be located to the rear of the number 2 baggage bay and include copper tubes and e-coated aluminum fins and have approximately 1,200 in² (7,742 cm²) of condensing surface. The receiver tank shall be equipped with a refrigerant sight gauge to be viewed through a window in the left-hand number 3 baggage compartment.

H.177.1.9. The evaporator shall be mounted under floor in the same compartment as the heater core for

H.177.1.10. "Reheat Cycle" and humidity control and shall include copper tubes and aluminum fins.

H.177.1.11. A separate control shall be provided for the front dash heating and air conditioning, as well as for the main under floor unit. A HVAC system control panel is required for the main under floor system. Control shall be within easy reach of the operator. The system shall allow the driver to set a specific interior coach temperature between the range of 60° F (16°C) and 80° F (27°C). The outside temperature can be displayed by switching between interior and exterior on the control panel. The HVAC controller shall monitor the temperature so that the interior temperature selected is maintained consistently. Where practicable, all controls shall be of a solid state design.

H.177.1.12. The system shall be designed with return air ducts at both front and rear of coach for balanced airflow. The system shall introduce a minimum of 10% fresh outside air when the fresh air intake is open.

H.177.1.13. Heat shall be applied to the front step tread to prevent accumulation of snow, ice, or slush. Step well heat shall be supplied and controlled by the driver's heater and defroster system. The manufacturer shall provide and install two valves with caps near the air conditioning compressor.

H.177.1.14. All electric motors which are part of the climate control system shall be permanent magnet type, except the Condenser and Main Evaporator motors, which shall be brushless type. Motors shall have double sealed, pre-lubricated anti-friction, replaceable ball bearings with moisture resistant grease. 3/8 inch (10 mm) and 5/16 inch (8 mm) diameter zinc terminal studs with bonded internal motor leads and anti-rotation insulators shall be used except driver’s evaporator and parcel rack evaporators.

H.178. CONTROLS

H.178.1. The heating, cooling, ventilating and off operational modes of the interior climate control system shall be controlled by switches or displays conveniently located to the driver. In the heating and cooling modes, the system shall be governed by an electronic control that regulates the amount of cooling and heating capacity available to the passenger area. The temperature will be adjustable between 60°F (16°C) and 80°F (27°C). The temperature sensors used must be suitable for transit service and accurate to +/- 1°F.

H.179. AIR FLOW

H.179.1. PASSENGER AREA

H.179.1.1. The cooling mode of the interior climate control system shall introduce air into the coach up along the sidewall at a minimum rate of 25 cubic feet (0.71³ m) per minute per passenger based on the standard configuration coach with full standee load. This air shall be composed of no less than 10 percent outside air. Airflow shall be evenly distributed throughout the coach with air velocity not exceeding 60 feet (0.305 meters) per minute on any passenger.

H.179.1.2. Airflow may be reduced to 15 cubic feet (0.43³ m) per minute per passenger when operating in the heating mode with full standee load. Heated air introduced into the coach shall contain no less than 10 percent outside air. In the heating mode, the fans will activate immediately to assure an air outlet temperature of 70 degrees F (21º C). Outside airflow may be cut off during initial warm up/cool down, provided that manual adjustment is not required.

H.180. DRIVER’S AREA
H.180.1. The coach interior climate control system shall deliver at least 200 cubic feet (6.0³ m) per minute of air to the driver's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shut down of the airflow. A separate heater or windshield defroster unit shall be capable of diverting heated air to the driver's feet and legs. The defroster motor shall be a permanent magnet type motor. The defroster or interior climate control system shall maintain visibility through the driver's side window. A separate evaporator, fan and control shall supply conditioned air to the driver's area.

H.181. AIR INTAKE

H.181.1. Outside openings for air intake shall be located to ensure cleanliness of air entering the climate control system, particularly with respect to exhaust emissions from the coach and adjacent traffic. All intake openings shall be baffled to prevent entry of snow, sleet, or water. Outside air shall be filtered before discharge into the passenger compartment. More efficient air filtration may be provided to maintain efficient heater and/or evaporator operation. The air filter shall be easily removed for service. Moisture drains from air intake openings shall be located so that they will not be subjected to clogging from road dirt, but shall be accessible for cleaning and inspection.

H.182. RADIO AND PUBLIC ADDRESS

H.182.1. MOBILE RADIO SYSTEM

H.182.1.1. A radio compartment, antenna, conduit, electrical and other requirements shall be provided to support a mobile radio system as and if required by the end user. The location, materials, and installation of all items installed on the coach in support of the mobile radio equipment is subject to approval by the end user. Any special tools required such as, but not limited to, security screwdrivers and latch handles shall be supplied.

H.183. PUBLIC ADDRESS SYSTEM

H.183.1. A public address system shall be installed that enables the driver to address passengers either inside or outside the coach. A total of at least 20 interior speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. Speaker shall be provided outside above the entrance door so that announcements can be clearly heard by passengers standing near the door(s). A driver controlled switch shall select inside or outside announcements. The system shall be muted when not in use. The microphone shall not interfere with the operation of the mobile radio system.

H.184. EMERGENCY EQUIPMENT

H.184.1. On board emergency equipment, per Federal Motor Carrier Safety Regulations Part 393, shall be provided with each coach. The equipment shall be mounted out of the way of passengers but shall be readily accessible:

H.184.2. Fire Extinguisher - 5 pound (2.3 kg) capacity, Underwriter's Laboratories rating of A, B, C or more, marked as such with charge indicator, mounted in a cradled bracket.

H.184.3. Emergency Warning Triangles – Three bi-directional emergency reflective triangles conforming to the FMVSS 125 in a case and mounted in the battery compartment.
## SECTION “H”
45’ CNG Commuter Coach
RESPONSE SHEET

### BASE VEHICLE COST PER UNIT

<table>
<thead>
<tr>
<th>BASE VEHICLE</th>
<th>COST PER UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRANSIT BUS (GAS ENGINE)</td>
<td>$</td>
</tr>
</tbody>
</table>

### LIST OPTIONAL ITEMS COST

<table>
<thead>
<tr>
<th>OPTIONAL ITEMS</th>
<th>COST PER ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNG CONVERSION CHASSIS</td>
<td></td>
</tr>
<tr>
<td>CNG BIFUEL CONVERSION CHASSIS</td>
<td></td>
</tr>
<tr>
<td>PROPANE DEDICATED CONVERSION</td>
<td></td>
</tr>
<tr>
<td>PROPANE DUEL FUEL CONVERSION</td>
<td></td>
</tr>
<tr>
<td>BACK-UP MONITOR SYSTEM</td>
<td></td>
</tr>
<tr>
<td>TWO-WAY RADIO (UHF)</td>
<td></td>
</tr>
<tr>
<td>TWO-WAY RADIO (VHF)</td>
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</tr>
<tr>
<td>TWO-WAY RADIO (800 MZ)</td>
<td></td>
</tr>
<tr>
<td>DRIVER’S SHIELD</td>
<td></td>
</tr>
<tr>
<td>PAINTED LOWER SKIRTS</td>
<td></td>
</tr>
<tr>
<td>OUTSIDE PASSENGER DOOR SWITCH</td>
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<tr>
<td>BUS CAMERA SYSTEM</td>
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<tr>
<td>FABRIC INSERT ON CEILING</td>
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<tr>
<td>STREET SIDE EXHAUST</td>
<td></td>
</tr>
<tr>
<td>INTEGRATED CHILD SEATS</td>
<td></td>
</tr>
<tr>
<td>VINYL SEATS (PRICE DEDUCTION)</td>
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</tr>
<tr>
<td>PUBLIC ADDRESS SYSTEM</td>
<td></td>
</tr>
<tr>
<td>PASSENGER SIGNAL SYSTEM PULL CORD</td>
<td></td>
</tr>
<tr>
<td>PASSENGER STOP REQUEST SIGNS</td>
<td></td>
</tr>
<tr>
<td>FARE COLLECTION BOX</td>
<td></td>
</tr>
<tr>
<td>DESTINATION SIGNS</td>
<td></td>
</tr>
<tr>
<td>BICYCLE RACKS</td>
<td></td>
</tr>
<tr>
<td>DELETE ALTRO CHROMA FLOORING (PRICE DEDUCTION)</td>
<td></td>
</tr>
<tr>
<td>DELETE YELLOW POWDER COATING ON HANDRAILS, GRAB RAILS, AND STANCHIONS (PRICE DEDUCTION)</td>
<td></td>
</tr>
<tr>
<td>100% NIDA-CORE STRUCTURE</td>
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</tr>
<tr>
<td>COMPOSITE FLOOR</td>
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</tr>
<tr>
<td>SIDE DOOR SLIDE OUT BATTERY BOX</td>
<td></td>
</tr>
<tr>
<td>DIESEL ENGINE</td>
<td></td>
</tr>
<tr>
<td>REAR SPARE TIRE HOLDER</td>
<td></td>
</tr>
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</table>

OMES/PURCHASING
<table>
<thead>
<tr>
<th>Item</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ADJUSTABLE REAR SUSPENSION SYSTEM</td>
<td></td>
</tr>
<tr>
<td>MEMO/PAMPHLET RACK (See Figure 6)</td>
<td></td>
</tr>
<tr>
<td>FREEDMAN SEATING TDSS (OR EQUIVALENT) FOLD AWAY SEAT (See Figure 7)</td>
<td></td>
</tr>
<tr>
<td>METAL BOX (See Figure 8)</td>
<td></td>
</tr>
<tr>
<td>EXTRA SEAT BELT EXTENSIONS</td>
<td></td>
</tr>
</tbody>
</table>

A LIST OF OPTIONAL EQUIPMENT AND/OR ACCESSORIES SHALL BE PROVIDED. THE LIST MUST CONTAIN:

- Item
- Description and functionality detail
- Cost of item installed in final delivery of vehicle
- Any changes to listed specifications as outlined above to accommodate options

**PROPOSAL EXCEPTIONS**

Supplier must list any exceptions here to be used as a part of the Proposal evaluation and analysis. Please list the roman numerical on the standard specs or the number for the options when listing any Proposal exceptions.
M. SPECIFICATIONS FOR 45’ DIESEL COMMUTER COACH

M.1. DELIVERY

M.1.1. Vehicle must be delivered at a maximum of 180 calendar days from the date a Purchase order is issued. Pre-delivery servicing and adjustments: prior to acceptance by the purchaser, the vendor shall service and adjust each vehicle for operation. This process shall include but not be limited to the following

M.1.2. The vehicle must have a full tank of fuel when delivered.

M.1.3. Each bus shall be designed to facilitate the disassembly, reassembly, servicing or maintenance thereof by use of tools and items that are normal and available as commercial standard items. The body and structure shall be designed for ease of maintenance and repair.

M.1.4. All parts added, as part of the modification process shall be new.

M.1.5. Headlights properly aligned

M.1.6. Engine Tuned

M.1.7. All accessories properly adjusted

M.1.8. Electrical, braking and suspension systems inspected

M.1.9. Both batteries Charged

M.1.10. Front-end aligned, all wheels balanced, including spare

M.1.11. All lubricants checked, and greased if needed

M.1.12. Cooling system serviced with permanent type anti-freeze and summer coolant for minus 20 degrees F (-28.888C).

M.1.13. Warranty papers and owner’s guide


M.1.15. Odometer cannot exceed 3,000 miles at the time of delivery of completed buses to the purchasing agency. There will be a charge of one dollar ($1.00) per mile for each vehicle with an odometer reading in excess of 3,000 miles payable to the purchasing agency at the time of delivery.

M.1.16. Under no circumstances are tow vehicles to be attached to any buses.

M.1.17. Each vehicle must be delivered to the agency submitting the P.O.

M.2. CERTIFICATE OF ORIGINS

M.2.1. Copies of the all Certificate of Origins and signed invoices must be emailed to the organization named on the purchase order five business days before delivery is made and originals must be delivered with the vehicle: receipt of these after delivery is not acceptable.

M.2.2. Vendor shall notify buyer of vehicle delivery ten business days prior.

M.3. CLASSES OF FAILURES

M.3.1.1. Class 1: Physical Safety. A failure that could lead directly to passenger or driver injury and represents a severe crash situation.

M.3.1.2. Class 2: Road Call. A failure resulting in an en route interruption of revenue service. Service is discontinued until the coach is replaced or repaired at the point of failure.

M.3.1.3. Class 3: Coach Change. A failure that requires removal of the coach from service during its assignments. The coach is operable to rendezvous point with a replacement coach.

M.3.1.4. Class 4: Bad Order. A failure that does not require removal of the coach from service during its assignments but does degrade coach operation. The failure shall be reported by driver, inspector, or hostler.

M.4. LEGAL REQUIREMENTS

M.4.1. The coach shall meet all applicable Federal Motor Vehicle Safety Standards and regulations as established by the U.S. Department of Transportation.

M.4.2. The manufacturer shall comply with all applicable Federal and State regulations. In event of any conflict between the requirements of this Specification and any applicable legal requirement, then the legal requirement shall prevail.
M.5. OVERALL REQUIREMENTS

M.5.1. DIMENSIONS

M.5.2. PHYSICAL SIZE

M.5.3. With the exceptions of exterior mirrors, marker and signal lights, bumpers, flexible portions of the bumper, fender skirts, and rub rail, the coach shall have the following overall dimensions.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>LENGTH</td>
<td>45' (+0/-1 IN)</td>
</tr>
<tr>
<td>WIDTH</td>
<td>8'6&quot; (+0/-1 IN)</td>
</tr>
<tr>
<td>HEIGHT</td>
<td>137&quot; MAXIMUM LOADED OR UNLOADED</td>
</tr>
<tr>
<td>FIRST STEP HEIGHT</td>
<td>15.5&quot; MAXIMUM</td>
</tr>
</tbody>
</table>

M.6. UNDERBODY CLEARANCES

M.6.1. The coach provided shall meet the following underbody clearances:

<table>
<thead>
<tr>
<th>Clearance</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPROACH ANGLE</td>
<td>9.50°</td>
</tr>
<tr>
<td>BREAKOVER ANGLE</td>
<td>7.20°</td>
</tr>
<tr>
<td>DEPARTURE ANGLE</td>
<td>6.20°</td>
</tr>
<tr>
<td>GROUND CLEARANCE</td>
<td>10.00 IN (254MM)</td>
</tr>
<tr>
<td>AXLE CLEARANCE</td>
<td>6.50 IN (165MM)</td>
</tr>
</tbody>
</table>

M.7. WEIGHT AND AXLE LOADING

M.7.1. Each vehicle, at a capacity load, shall not exceed the gross vehicle weights or maximum axle weights specified. In no case shall the axle weight exceed 22,500 pounds on any axle. In the interest of economy in construction and operation it shall be the goal to manufacture the coach as light as possible without degradation of structure, performance, appearance, comfort and reliability. Total vehicle weight shall not exceed the gross vehicle weight rating nor axle weight rating at ground as specified. GVWR shall not exceed 50,000 pounds for a 45-foot bus. Combined load capacity weight on the drive and tag axles shall not exceed 36,500 pounds.

M.8. CAPACITY

M.8.1. Rated passenger capacity of the coach shall be as outlined below. Provisions to secure two wheelchair passengers shall also be provided. The overall seating capacity may be reduced when the securement positions are being utilized.

<table>
<thead>
<tr>
<th>Type</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>45'/102&quot; BUS</td>
<td>57 SEATS</td>
</tr>
<tr>
<td>45'/102&quot; BUS WITH LAVATORY</td>
<td>55 SEATS</td>
</tr>
</tbody>
</table>

M.9. SERVICE LIFE AND MAINTENANCE

M.9.1. SERVICE LIFE

M.9.1.1. The coach shall be designed to operate in commuter service for at least 12 years or 500,000 miles (804,672 km) of revenue service whichever comes first.

M.10. MAINTENANCE AND INSPECTION

M.10.1. 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 (9,656 km), except for routine daily service performed during the fueling operations. Higher levels of scheduled maintenance tasks shall occur at even multiples of mileage for lower level tasks.

M.10.2. The manufacturer shall provide a preventive maintenance schedule covering all components upon delivery of the first production vehicle. Each schedule shall be complete and shall adhere to frequency intervals considered normal industry standards.

M.11. MEAN MILEAGE BETWEEN FAILURES
M.11.1. The following are design goals for mean mileage between failures by failure class, provided that all specified preventive maintenance procedures are followed:

M.11.1.1. Class 1: Physical Safety. Mean mileage shall be greater than 1,000,000 miles (1,609,344 km).
M.11.1.2. Class 2: Road Call. Mean mileage shall be greater than 20,000 miles (32,187 km).
M.11.1.3. Class 3: Coach Change. Mean mileage shall be greater than 16,000 miles (25,750 km).
M.11.1.4. Class 4: Bad Order. Mean mileage shall be greater than 10,000 miles (16,093 km).

M.12. ACCESSIBILITY

M.12.1. All systems or components serviced as part of periodic maintenance or whose failure may result in Class 1 or Class 2 failures shall be readily accessible for service and inspection. Removal or physical movement of components unrelated to the specific maintenance and/or repair tasks involved shall be minimized.

M.13. INTERCHANGEABILITY

M.13.1. Components with identical functions shall be interchangeable with the exception of windows and baggage bay doors. Components with non-identical functions shall not be, or appear to be, interchangeable.

M.14. OPERATING ENVIRONMENT

M.14.1. The coach shall achieve normal operation in temperature ranges of -10 to 110 degrees F (-23º to 43º C), at relative humidity between 5 percent and 100 percent and at altitudes up to 5,000 feet (1,524 m) above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below -10 degrees F (-23º C) and above 110 degrees F (+43º C) or at altitudes above 5,000 feet (1,524 m). Special equipment or procedures may be employed to start the coach after a 12 hour or more exposure to temperatures below +30 degrees F (-1º C) without the engine in operation.

M.14.2. Speed, gradability, and acceleration performance requirements shall be met at, or corrected to, 85 degrees F (29 C), 29.00 inches (737 mm) Hg, dry air. Performance degradation at conditions other than the test standard shall not exceed 1 % for each 3 degrees F/C and 4 % for 1,000 feet (305 m) of altitude above the standard.

M.15. MATERIALS AND CONSTRUCTION

M.15.1. For economy in maintenance, it is essential that parts and units be arranged so that rapid assembly and disassembly will be possible for the coach being provided. The dimensions of all parts, unless particularly specified, will be in accordance with current standards of the Society of Automotive Engineers, or the metric equivalents. All units or parts not specified shall be Manufacturer’s standard units or parts and shall conform in material, design and workmanship to industry standards and shall meet or exceed all Federal and State motor vehicle safety standards. During the manufacturing of the coaches all parts shall be new and in no case will used, reconditioned or obsolete parts be accepted. No advantages shall be taken by the Manufacturer in the omission of any parts or details that make the coach complete and ready for service, even though such parts or details are not mentioned in these specifications.

M.15.2. Workmanship throughout shall conform to the high standard of commercially accepted practice for the class of work and shall result in a neat and finished appearance. All exposed surfaces and edges shall be smooth, free from burrs and other projections, and shall be neatly finished. Exposed metal surfaces, prior to paneling or covering shall be properly prepared and coated with protective material to insure against corrosion or deterioration.

M.15.3. All lubrication points, unless otherwise specified, shall be capable of accepting a high pressure grease gun operated on fittings that permit grease to travel into the lubrication point but does not permit the grease to escape and designed so that when the grease gun is withdrawn, there is a positive barrier preventing dirt from entering the fitting. These fittings shall be of one manufacture and shall be accessible for a grease gun while the vehicle is being serviced on either a lift or a pit.

M.16. BODY

M.16.1. DESIGN

M.16.1.1. The coach shall have a clean, smooth, simple design, primarily derived from coach performance requirements and passenger service criteria. Body construction shall not be of a body on chassis type. The exterior and body features, including grilles and louvers, shall be shaped to allow complete and easy cleaning by automatic bus washers without snagging washer brushes. The retention of water and dirt in or on any of the body features or the freezing or bleeding out of this dirt and water after leaving the washer shall be minimized. 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 coach.
Accumulation of spray and splash on any window of the coach generated by its wheels on a wet road shall be minimized. The undercarriage of the coach shall be sealed off to the maximum extent practicable to significantly reduce the intrusion of road spray.

M.17. MATERIALS

M.17.1. Body materials shall be selected and the body fabricated to reduce maintenance, extend durability, and provide consistency of appearance throughout the life of the coach. Detailing shall be kept simple; add-on devices and trim shall be minimized and, where necessary, integrated into the basic design.

M.17.2. Fabric material used for sidewalls, ceiling, parcel rack, and entrance area shall be Holdsworth Aura or approved equal.

M.18. FINISH AND COLOR

M.18.1. All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly cleaned and primed as appropriate for the paint used, 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 coach.

M.18.2. Paint utilized shall be DuPont Imron Elite SS white N5793EA polyurethane enamel or approved equal, that exhibits excellent color and gloss retention, chip, abrasion, stain and mar resistance, chemical and solvent resistance and excellent cleaning characteristics per industrial standards. Paint shall be applied smoothly and evenly with the finished surface free of dirt, runs, sags, "orange peel" type pebbled surface, and other imperfections.

M.18.3. All exterior finished surfaces shall be impervious to diesel fuel, gasoline, and commercial cleaning agents such as soaps, detergents and degreasing compounds. Finished surfaces shall not be damaged by controlled applications of commonly used graffiti-removing chemicals.

M.18.4. Vendor shall provide buyer options of available paint colors for the exterior three color paint scheme.

M.19. NUMBERING AND SIGNING

M.19.1. Monograms, numbers and other signing shall be applied to the inside and outside of the coach as required. Signs shall be durable and fade, chip, and peel-resistant; they may be decals, or pressure-sensitive appliqués. Emergency exit information shall be provided in both English and Spanish.

M.20. PEDESTRIAN SECURITY

M.20.1. Exterior protrusions greater than 0.250 inch (6.0 mm) and within 80 inches (203 cm) of the ground shall have a radius no less than the amount of the protrusion. The left and right side rear view mirrors, windshield washer nozzles and required lights and reflectors are exempt from the protrusion requirement. Grilles, doors, bumpers and other features on the sides and rear of the coach shall be designed to minimize the ability of unauthorized riders to secure toeholds or handholds.

M.21. STRUCTURE

M.21.1. STRENGTH AND FATIGUE LIFE

M.21.1.1. The structure shall be of a sufficiently strong and efficient design to withstand the conditions of commuter service throughout the service life of the coach.

M.22. DISTORTION

M.22.1. 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 (152 mm) curb or in a 6 inch (152 mm) deep hole.

M.23. RESONANCE

M.23.1. 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.

M.24. MATERIAL

M.24.1. Reinforced fiberglass and plastic materials shall be excluded from structural body construction, except for replaceable panels or doors and for non-load bearing front and rear roof caps and the front lower panel below the windshield and the A-pillar covers and transom panels.

M.25. CORROSION
M.25.1. The coach shall resist corrosion from atmospheric conditions and road salts. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, provided it is maintained in accordance with the procedures specified in the service manual. All exposed body panels above and below the floor line shall be aluminum or stainless steel except for the front end upper and lower panels, the rear end upper panels and the upper sidewall panel which are made of fiberglass or galvanized steel. Materials exposed to the elements and all joints and connections of dissimilar metals shall be corrosion-resistant and shall be protected from galvanic corrosion. All frame members below the passenger floor that are subject to road splash and are less than 0.06 inch (1.5 mm) shall be stainless steel for maximum corrosion protection. All other frame members exposed to splash are to be High Strength Low Alloy steel and are to be 0.06 inch (1.5 mm) thick minimum and shall be coated with Tectyl undercoating or approved equal, on all surfaces exposed to road splash for maximum corrosion protection.

M.25.2. Floor supports in the passenger and drivers area, the sidewall structures and roof structures that are not exposed to road spray shall be High Strength Low Alloy and primed prior to incorporation into the coach assembly.

M.25.3. Outer sidewall panels above the passenger floor and below the windows shall be galvanized steel, pre-primed. The roof panels shall be pre-primed aluminum both sides and the front and rear roof caps fiberglass.

M.25.4. The upper rear engine door and louvers may be fiberglass panels mounted to stainless steel frames with powder coated aluminum screens. The upper side corner panels may be fiberglass with powder coated aluminum screens.

M.25.5. The upper wheelchair lift door may be made of an aluminum frame or other acceptable lightweight material and aluminum exterior panel.

M.25.6. Non-structural underbody panels used for baggage bay floors and to retain insulation in other areas, shall be Tectyl or approved equal undercoated aluminum or stainless steel for maximum corrosion protection. In the wheel well areas, non-structural closeout panels shall be stainless steel.

M.25.7. Before assembling, all metal body parts must be given a thorough anti-corrosion treatment. Joints between dissimilar metals shall be properly insulated with an inert plastic tape to avoid corrosion due to electrolytic action. All nuts, bolts, clips, washers, clamps, and like parts shall be zinc plated, phosphate coated, black oxide coated, stainless steel, or nylon to prevent corrosion. All exterior joints and seams must be sealed.

M.25.8. Dissimilar metals must be separated by a non-conductive barrier.

M.25.9. Non-Conductive Barriers may consist of one of the following:

M.25.9.1. Black elastic compound tape
M.25.9.2. Mylar tape
M.25.9.3. Double-sided structural adhesive tape

M.25.10. Where tape barriers are not feasible an appropriate sealant shall be used to provide a protective barrier and a water tight seal. This sealer must be used on all panels and assemblies that are susceptible to water leaks.

M.26. TOWING

M.26.1. Towing devices shall be provided and be permanently mounted on the front and rear of the coach. The coach may be towed from the front only, but can be recovered from the rear. Recovery shall mean to move the bus into the clear so it can be hooked up and towed from the front. Lift and tow is not required.

M.26.2. Front towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the coach within 20° of the longitudinal axis of the coach. Towing device shall accommodate a crane hook with a 1-inch throat. A minimum of two steel rear skid plates measuring approximately 15.2 x 3.3 inches (386 x 84 mm) shall be welded to the underside of the engine rails. Skid design shall be durable construction to adequately protect mechanical or other body components from damage due to the coach bottoming out.

M.27. JACKING & HOISTING

M.27.1. It shall be possible to safely jack up the bus, at curb weight, with an 8.5 inch (216 mm) high hydraulic hand jack or a 10-ton (9,072 kg) floor jack when a tire or dual set is completely flat and the bus is on a level hard surface. Jacking from a single point shall permit raising the bus sufficiently high enough to remove and reinstall any wheel and tire assembly. The bus shall be fitted with jacking pads for each tire/wheel locations and shall permit easy and safe jacking with the flat tire or dual set on a 3.5-inch (89 mm) high run-up block not wider than a single tire. The bus will withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage. The bus axles or jacking plates
shall accommodate the lifting pads of a post hoisting system. Jacking plates shall be approximately 2.00 inches (51 mm) square, with a turned-down flange not less than 0.5 inch (13 mm) deep on each side. Other pads shall be provided to support the bus on jack stands independent of the hoist.

M.28. FIRE SUPPRESSION

M.28.1. An Amerex or approved equal modular vehicle fire suppression and overheat warning system will be provided to detect and extinguish fires in the engine compartment. The system will be electrically controlled. A 25-lb. (11-kg) dry-chemical extinguisher cylinder will be installed in the #3 baggage compartment. Three thermostats and four extinguisher nozzles will be installed in the engine compartment in strategic locations. If the thermostats detect excessive heat, then the cylinder will discharge a dry chemical agent into the engine compartment. A button at the end of the left-hand console will trigger the extinguisher. A control panel above the driver will monitor the system. Normally a green LED indicating “System OK” will be illuminated on the front of the monitor. When a fire is detected a red LED and buzzer on the control panel will warn the driver. When the fire has been extinguished the green LED will light again.

M.28.2. The fire suppression system will be powered by the coach’s electrical system, but an internal rechargeable back-up battery will be provided in case the coach’s electrical system is interrupted.

M.29. FIRE PROTECTION

M.29.1. The passenger and engine compartments shall be separated by a bulkhead(s) which shall, by utilization of fire resistant materials in its construction, be a firewall. This firewall shall preclude or retard propagation of an engine compartment fire into the passenger compartment. Only necessary openings shall be allowed in the firewall, and these shall be fire resistant. Any passageways for climate control system air flow shall be separated from the engine compartment by fire resistant material. Piping through the center tunnel bulkhead shall be copper, steel, nylon air brake tubing (for air and fuel), PVC (closed conduit) or brass and shall be sealed with fire-resistant material at the firewall. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the firewall. The conduit and bulkhead connectors shall be sealed with fire resistant material at the firewall. Engine access panels in the firewall shall be fabricated of fire resistant material and secured with fire resistant 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. The coach body shall be adequately sealed to prevent the intrusion of smoke, fuel, and fumes into the coach interior.

M.30. LEAK DETECTION SYSTEM

M.30.1. A mobile gas leak detection system manufactured by Amerex Corporation or approved equal shall be provided when applicable. Methane detection capability shall be provided in the follow areas:

M.30.2. Engine compartment one detector minimum Fuel storage area - as required.

M.30.3. Detectors are to be designed to prevent vandalism or damage from external sources.

M.30.4. The AMGADS III system, or approval equal, shall detect and quantify airborne concentrations of methane from 0 % LEL to 100 % LEL and shall continue to give the indication of the presence of gas at concentrations above 100 % LEL.

M.30.5. The system shall be integrated with the engine stop override system to permit the operator more time, if required, to stop the vehicle. The system shall be powered through the battery insulation switch(es) and be in full time sampling mode any time the master control switch is in the “on” position. The system shall be self-restarting following power interruption or have backup batteries to prevent interruption of function.

M.30.6. The system shall be capable of operating normally without failure from -65 degrees F to +185 degrees F, and at relative humidity levels from 0% to 99%. Components operating within the engine compartment shall operate in temperatures up to 250 degrees F. Any single failure of a detection device shall cause an indicator light on the control panel to illuminate.

M.30.7. The system shall operate at supply voltages from 9 to 30 VDC as produced by the coach electrical system, and be designed to withstand positive and negative voltages spikes of 500 VDC, and electrostatic discharge of 15000 volts without failure. Total current draw of the system under normal operating conditions shall not exceed 750 mA. System design shall comply with SAE J1211 criteria for automotive electronic equipment as a minimum.

M.31. ALARM LEVELS

M.31.1. The system shall generate audible and visual alarms at two non-adjustable concentration levels. This system shall also supply one user assignable auxiliary shift relay for such functions as alarms and signal light actuation, fuel valve shut off and ignition interruption. Alarms shall provide audible notification of detector activation inside the coach.
M.32. CALIBRATION REQUIREMENTS

M.32.1. The system shall register and report zero drift as a dangerous situation requiring attention. Drifts in calibration at other than the zero level shall either always be such as to produce a failsafe (false high) reading or shall give notification of a reading as a dangerous situation requiring attention (false low).

M.33. MONITOR PANEL

M.33.1. The system shall have a supervision monitoring panel located in the operator’s area. The monitor panel shall indicate operational status of the sensors, harness, and calibration with visual indicators provided on the operators indicator panel.

M.34. EXTERIOR AND APPLIED PANELS

M.34.1. Roof Panels

M.34.1.1. Front roof cap and rear crown panels shall be nominal 0.13 inch (3.17 mm) thick fiberglass-reinforced, molded plastic incorporating molded indentations for the marker, clearance and identification lights. Main roof panels shall be 16 gauge, nominal 0.05 inch (1.29 mm), high tensile primed aluminum. Roof panels shall be bonded to the roof structure with adhesive.

M.34.2. Front Panels

M.34.2.1. The front body panel below the windshield shall be of one-piece molded fiberglass. A fiberglass trim fascia shall be provided under the windshield. It shall include molded housings for the headlamp, turn signal and clearance lamp assemblies.

M.35. STRENGTH AND INSTALLATION

M.35.1. Exterior panels above and below the rub rail may be structural components. Panels shall be secured to structural members and shall have a smooth finish with no sharp edges.

M.36. REPAIR AND REPLACEMENT

M.36.1. Exterior panels below the rub rail shall be divided into sections that are repairable or replaceable by a mechanic. Baggage doors shall be two part with the joint at or below the rub rail.

M.37. RAIN GUTTERS

M.37.1. Gutters shall be provided to minimize water flowing from the roof onto the side windows and passenger doors.

M.38. LICENSE PLATES

M.38.1. A recessed mounting area shall be provided to mount a standard size U.S. license plate on the rear of the coach. This provision shall recess the license plate so that automatic coach washing equipment brushes will not catch on the license plate. Four fasteners shall be utilized to retain the license plate. The license plate shall be mounted to the left of the coach center. Provision shall be made to illuminate the surface of the rear license plate.

M.39. RUBRAILS

M.39.1. Rub rails shall have a minimum height dimension of 2.50 inches (64 mm) and shall be composed of flexible, resilient material to protect both sides of the coach body from damage caused by minor sideswipe accidents. The rub rail may be discontinued at doorways and the condenser intake grille. A damaged portion of the rub rail shall be replaceable without requiring removal or replacement of the entire rub rail.

M.40. MOLDINGS

M.40.1. Sash Moldings

M.40.1.1. Painted aluminum sash moldings shall be installed along the bottom length of the passenger windows.

M.40.2. Belt Moldings

M.40.2.1. Painted aluminum belt moldings shall be installed along the left and right hand belt lines of the coach.

M.41. PARCEL RACKS

M.41.1. A minimum 10 module parcel rack without dividers and compartment doors shall be furnished over all two-passenger seating positions except in the wheelchair door area. Retention cords shall run the length of the rack housing except where air conditioning components are housed. These compartments will have
dividers locking doors. The parcel rack edge, running along the full length of the aisle, shall incorporate a handhold for use by standees. Passenger headroom measured from the rack end to the top of the seat headrest, shall be a minimum 17 inches (432 mm). Interior window post caps shall be ABS, thermoformed plastic, off-white in color to provide a clean finished appearance. The interior of the rack shall be vinyl covered aluminum to complement the interior. Parcel racks shall be supported by polycarbonate glass filled hangers spaced approximately 40 inches (1,016 mm) apart. Total capacity shall be a minimum 109 ft.³ (3 m³) to allow for ample storage space for carry-on items.

M.41.2. Passenger service modules mounted on the underside of the parcel rack shall include individually controlled and adjustable LED passenger reading lights, and an exit signal push button, red in color and individual air distribution outlets receiving air from the parcel rack HVAC system. These outlets shall be adjustable from fully closed to full open position. A minimum of twenty-six speakers shall also be provided in the cluster panels for the driver controlled public address system. Speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. Passengers utilizing the securement systems shall be provided identical amenities as provided for all other passengers except that the parcel rack shall be deleted in the area of the wheelchair lift door. Separate and independent notification will be provided on the dashboard indicator panel for stop request notification from securement positions.

M.41.3. Parcel racks shall have air conditioning.

M.42. UNDERFLOOR BAGGAGE COMPARTMENTS

M.42.1. Full width under floor baggage compartments shall be provided between the front and rear axles. Each compartment shall be separated by an aluminum panel except the front and rear bulkheads shall be stainless steel. The compartment doors shall be a two part with the joint at or below the rub rail, fully sealed vertical lift pantograph type. Each door shall include an aluminum or composite frame with an aluminum outer panel. Doors shall be spring counter balanced for ease of operation.

M.42.2. The no. 1 right hand, curbside baggage door shall have a key lock. All other baggage doors shall be equipped with air locks. Each baggage door shall have a 4.0 x 10 inch (102 x 254 mm) flush mounted breakaway type latch handle located with a center point approximately 38 inches (965 mm) off the ground.

M.42.3. Each under floor compartment shall be pressurized and illuminated with two LED lamps when the doors are opened. The lamp fixtures shall be sealed to preclude the intrusion of dust and moisture into the fixture. The floor of the baggage compartments shall be corrugated aluminum.

M.43. INTERIOR

M.43.1. HEADROOM

M.43.1.1. Headroom above the aisle shall be no less than 78 inches (1,981 mm). If an engine brake is to be provided, then a “hump” ahead of the rear cross seat will decrease headroom to approximately 74 Inches (1,880 mm).

M.44. DRIVER’S BARRIER

M.44.1. A barrier or bulkhead between the driver and street side front passenger seat shall be provided. The barrier shall eliminate glare and reflections from interior lighting in the windshield directly in front of the barrier during night operation.

M.44.2. The driver’s barrier shall be constructed of opaque .472 inch (12 mm) thick acrylic glazing. The barrier shall be a shatter-proof acrylic sheet that meets AS standards AS-4 or AS-5. The glazing shall be indelibly marked with the manufacturer’s name and type of material.

M.44.3. The drivers barrier shall extend from below the level of the passenger or driver seat cushion, whichever is lower, to above the level of the seated driver’s head and shall fit within 1.5 inches (38 mm) from the coach side window/wall to prevent passengers from reaching the driver or his/her personal effects. The barrier design shall accommodate a minimum of 9.05 inch (230 mm) fore and aft travel of the specified operator’s seat.

M.44.4. On the aisle side, the barrier shall be cut out from the vertical stanchions to permit passengers to use the stanchion as a handhold. Any panels above and below the glazing shall be complementary in color to the sidewall material.

M.44.5. All controls, including the driver's dimmer switch for first two rows of reading lights will be relocated to the LH Console and the RH. Console deleted.

M.45. MODESTY PANELS

OMES/PURCHASING
M.45.1. Sturdy modesty panels constructed of durable, unpainted, corrosion-resistant material complementing the interior trim shall be provided at the rear of the step well. The modesty panel and its mounting shall withstand normal kicking, pushing, and pulling loads of 200-pound (91 kg) passengers without permanent visible deformation.

M.46. REAR BULKHEAD
M.46.1. The rear bulkhead paneling shall be contoured to fit the ceiling, side walls and seat.

M.47. CONSTRUCTION
M.47.1. Interior panels may be integral with, or applied to, the basic coach structure. They shall be decorated in accordance with and compliment the interior specified. Use of moldings and small pieces of trim shall be minimized, and all parts shall be functional. Panels shall be of backed melamine, vinyl-clad aluminum or vinyl-clad steel. Front and rear closures shall be fiberglass with color molded in, and there shall be no painted surfaces. The lower sidewall shall be Melamine covered panels or approved equal, sectionalized for ease of repair.

M.48. FASTENING
M.48.1. Interior panels shall be attached so that there are no exposed edges or rough surfaces. Panels and fasteners shall not be easily removable by passengers. Interior trim fasteners, where required, shall be rivets, Phillips, or tamper-proof screws.

M.49. FLOOR
M.49.1. STRENGTH
M.49.1.1. The floor deck may not be integral with the basic structure but shall be mounted on the structure securely to prevent chafing or horizontal movement. Sheet metal screws shall not be used to retain the floor. All floor fasteners shall be secured and protected from corrosion for the service life of the coach. 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 0.375 inches (10 mm) from the normal plane. The floor shall withstand the application of 3.0 times gross load weight without permanent detrimental deformation.

M.50. EDGES
M.50.1. The floor shall be essentially a continuous flat plane, except at the step well. Where the floor meets the walls of the coach, the surface edges shall be blended with a circular section of radius not less than .5 inch and a molding or cover shall prevent debris accumulation between the floor and wall. Interior flooring shall be flat throughout except for an 8 ft. (2.4 m) long welded ramp in the aisle section at the front which is sloped 5.35 degrees and has a 3 inch (76 mm) riser under the #1 RH and #1 LH passenger seats except for a “hump” in front of the rear cross seat (when engine brakes are provided). The floor is attached to the underframe with adhesive and rivets. Wheel housings may not extend above floor line.

M.50.2. Access openings in the floor shall be sealed to prevent entry of fumes and water into the coach interior. Flooring material shall be flush with the floor and shall be edge-bound with stainless steel to prevent the edges from coming loose. Access openings may be symmetrical if the fasteners are arranged to ensure alignment of the flooring. Fasteners shall be flush with the floor when secured.

M.50.3. Rubber flooring adhesion procedure includes butt cut type edges that are securely bonded to the plywood floor with a waterproof adhesive. Flooring areas which are edge-bound with stainless steel shall include the sidewall on each side, the ramp in the center aisle, the base of rear cross seat, the step up under the number 1 seat, the driver’s modesty panel and the RH front passenger’s modesty panel.

M.51. FLOOR PROTECTION
M.51.1. The floor, as assembled, including the sealer, attachments, and covering, shall be waterproof, non-hygrosopic, resistant to heat, dry rot, mold growth, and impervious to insects. Plywood shall be no less than one half-inch thick 5 ply water resistant Douglas Fir per CSA 0121-M1978 or PS1-95 (APA) and shall be installed with all edges sealed. The floor in the aisle shall be no less than an overall thickness of one half-inch water resistant Douglas Fir per CSA 0121-M1978 or PS1-95 (APA).

M.52. STEPS AND STEPWELL
M.52.1. STEPS
M.52.1.1. There shall be no more than 4 steps and no step shall be located between the vestibule and passenger compartment. A ramp shall be provided in this area with the rate of rise not to exceed 0.75 inch (19 mm) per foot with a maximum vertical rise of 9.0 inches (229 mm).
M.52.1.2. All step treads shall be of uniform depth no less than 11 inches (279 mm) and a uniform height of no less than 9.5 inches (241 mm). Except for the first step, the plane of the step treads shall be parallel to the plane of the floor. Treads shall be covered with RCA flooring or approved equal that shall remain effective in all weather conditions. Color of the tread covering shall match the vestibule flooring. The edge of the vestibule floor shall have no overhang at the step riser. The edge of the vestibule floor and the edge of each of the step treads shall have a bright, contrasting white band, 2 inches (51 mm) wide, the width of the step. This band shall be uniform in width across the entire step and vestibule edge.

M.53. STEPWELL CONSTRUCTION

M.53.1. Step well shall be constructed entirely of stainless steel. The steps shall simultaneously support 300 pound (136 kg) loads evenly distributed over the center half of each step tread without permanent deformation and with elastic deflection of no more than 0.0625 inches (1.6 mm). Each step tread shall support a load of 500 pounds (227 kg) evenly distributed over the center half of the tread without permanent deformation. A minimum 1.0 inch (25.4 mm) thick Tu-Coat or approved equal, self-adhesive insulation shall be provided behind the step well area for added control of interior temperature variances and to minimize road noise.

M.54. WHEEL HOUSING

M.54.1. CONSTRUCTION

M.54.1.1. Wheel housings shall be constructed of stainless steel. Wheel housing, as installed and trimmed, shall withstand impacts of a 2-inch (51 mm) steel ball with at least 200 foot-pounds (271 Nm) of energy without penetration.

M.55. CLEARANCE

M.55.1. Sufficient clearance and air circulation shall be provided around the tires, wheels, and brakes to preclude overheating. Interference between the tires and any portion of the coach shall not be possible in maneuvers up to the limit of tire adhesion with weights from wet to GVWR.

M.56. FENDER SKIRTS

M.56.1. Front and rear wheel wells shall be fully skirted with rubber to minimize spray and splash. The fender skirts shall be damage resistant and easily replaceable. They shall be flexible if they extend beyond the allowable body width. Wheels and tires shall be removable without disturbing the fender skirts.

M.57. SPLASH APRONS

M.57.1. Splash aprons, composed of 0.25 inch (6 mm) minimum composition or rubberized fabric or 0.188 inch (5 mm) nylon reinforced rubber, shall be installed behind all wheels and shall extend downward. Apron widths shall be no less than tire widths. Splash aprons shall be bolted to plates which are welded to the coach understructure. The plates shall support the splash apron across its entire width. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. Splash aprons and their attachments shall not be included in the road clearance measurements. Other splash aprons shall be installed where necessary to protect coach equipment.

M.58. PASSENGER ENTRANCE DOOR

M.58.1. An electrically controlled, air-operated, power bi-fold door with keyed lock, will be located forward of the right front wheel. The non-symmetrical door will have a clear opening width of 30 inches (762 mm) up to a height of 44 inches (1117 mm). The clear door opening height will be 84.5 inches (2,146.3 mm).

M.58.2. The door shall be of composite material construction with a stainless steel kick panel for the lower portion. A molded fiberglass-reinforced panel shall be on the interior of the door. Upper and lower hinge assemblies shall be cast, with a stainless steel lower hinge pin pivoting inside a spherical bearing.

M.58.3. An upper – primary and lower – secondary window shall be installed in the entrance door. The primary double-glazed window in the upper half of the door shall be of AS-2 laminated heat-absorbing safety glass. The secondary window, located in the lower section of the door, shall be of 0.5-inch (12.7 mm) acrylic.

M.58.4. Door control shall be provided by a momentary switch, located to the left of the steering wheel. An exterior remote external control switch shall also be located in a side-wall pocket by the entrance door. The door shall have positive automatic air lock with overrule. The air lock will be automatically actuated by a micro switch when the door is in the closed position.

M.58.5. An entrance door key lock shall be provided on each coach along with two spare keys.
M.59. SERVICE COMPARTMENTS AND ACCESS DOORS

M.59.1. INTERIOR

M.59.1.1. Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Removal of fixtures or equipment unrelated to the repair task to gain access shall be minimized. Access doors, if hinged, shall be hinged with props, as necessary, to hold the doors up and out of the mechanic’s way with the exception of the destination sign box door which hinges down and is held by straps in the open position. Panel fasteners shall be standardized so that only two tools are required to service all special fasteners within the coach. These fasteners shall be captive in the panel except for the engine compartment and antenna access hatches. Access doors for the door actuator compartments shall be secured with hand screws or latches, and shall be sealed to prevent entry of mechanism lubricant into the coach interior. All hinges and props must be designed to preclude accidental closure when the panels are opened.

M.59.2. EXTERIOR

M.59.2.1. Vertically 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, engine lubricant, transmission fluid and the windshield washer reservoir. The upper engine radiator/C.A.C. compartment door shall be vertically hinged with a locking latch located behind the engine compartment doors. Access to these compartments shall be from outside the coach. 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 be capable of withstanding severe abuse throughout the life of the coach. They shall close flush with the body surface. All service/maintenance doors, excluding baggage compartment 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 coach washing operations. Doors with top hinges shall have props stored behind the door or on the door frame. All access doors (except vertically hinged access doors) shall be sufficiently retained in the open position by props or counterbalancing, as with baggage compartment doors. Springs and hinges shall be corrosion-resistant and shall last throughout the service life of the coach. They shall close flush with the body surface. All service/maintenance doors, excluding baggage compartment 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 coach washing operations. Doors with top hinges shall have props stored behind the door or on the door frame. All access doors (except vertically hinged access doors) shall be sufficiently retained in the open position by props or counterbalancing, as with baggage compartment doors. Springs and hinges shall be corrosion-resistant and shall last throughout the service life of the coach. Latch handles shall be sized to provide an adequate grip for opening. Large access doors shall hinge up and out of the way or fold flat against the coach body and shall be easily operable by one person. These doors, when opened, shall not restrict access for servicing other components or systems. Retention devices utilized to hold the engine compartment access doors in the open position shall be heavy duty and designed to last the service life of the coach.

M.60. LOCKED COMPARTMENTS

M.60.1. Vendor will provide the option to have vehicle locked compartments to be keyed alike or different key to access each locked compartment.

M.61. OPERATING COMPONENTS

M.61.1. DOORS

M.61.2. CONTROL

M.61.2.1. Operation of, and power to, the passenger door shall be completely controlled by a switch located in close proximity to the driver to the left of the steering wheel. A control or valve in the driver’s compartment shall shut off the power to, and/or dump the air from the front door mechanism to permit manual operation of the front door with the coach shut down. A toggle switch on the exterior of the coach shall permit opening of the front door. The switch shall be concealed behind an unmarked flip up cover. The door switch cover shall be spring loaded so as to be held in the closed position and be located rearward of the entrance door.

M.62. ACTUATORS

M.62.1. The nominal door opening and closing speed shall be in the 3-5 second range. The maximum door opening and closing speeds will be regulated using fixed, maintenance free orifices and airline sizes. If required, door speeds can be decreased with the addition of a flow-restricting device. Actuators and the complete door mechanism shall be concealed from passengers, but shall be easily accessible for servicing.

M.63. MANUAL OPERATION

M.63.1. In the event of an emergency, it shall be possible to open the door manually from inside the coach.
after actuating an unlocking device. The nameplate for the entrance door air dump valve shall say: “Emergency Only – To manually open entrance door push knob.” All references shall detail the “manual” operation of the door.

M.64. WINDSHIELD WIPERS AND WASHERS

M.64.1. WINDSHIELD WIPERS

M.64.1.1. The coach shall be equipped with three speed electric windshield wipers for each half of the windshield. Both wipers shall park along the center vertical edges of the windshield glass. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service from outside the coach only and shall be removable as complete units. Mounting shall preclude cracking or damage to the windshield frame. Power supply to the wiper motors shall be provided through a dedicated circuit.

M.64.1.2. An intermittent operation feature for each wiper shall be provided with a variable time delay. After each pause, the wiper shall make one complete cycle across the windshield surface and return to the park position automatically.

M.65. WINDSHIELD WASHERS

M.65.1. 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. Two separate washer pumps are to be provided.

M.65.2. The windshield washer system shall have a 3.9 gallon (15 liter) translucent reservoir, located for easy refilling. Reservoir pumps, lines and fittings shall be corrosion-resistant, and the reservoir itself shall be translucent for easy determination of fluid level. The windshield washer system shall be protected with an anti-freeze washer solution to -20°F (-29°C), regardless of season of delivery. The protected solution shall be tinted to provide easy visual indication that anti-freeze is present.

M.66. LIGHTING, CONTROLS, INSTRUMENTS

M.66.1. EXTERIOR LIGHTING

M.66.1.1. All exterior lighting systems shall be nominal 12V or 24V. The use of LED lamp assemblies shall be maximized to the extent practicable. All exterior lighting fixtures shall be sealed to prevent entry and accumulation of moisture or dust and each lamp shall be replaceable in less than 5 minutes by a mechanic. Lamps, lenses and fixtures shall be interchangeable to the extent practicable, and fixtures shall be corrosion resistant with sockets to be brass or stainless steel or plastic housings. Lamps at the rear of the coach, except the license plate lamp, shall be visible from behind when the engine service doors are opened. Sockets shall comply with SAE Standard J576C.

M.66.1.2. Visual and audible warnings shall inform following vehicles or pedestrians of reverse operation. Visual reverse operation warning shall conform to SAE Standard J593. Audible reverse operation warning shall conform to SAE Recommended Practice J994-Type C or D. Daytime running lights are to be provided.

M.66.1.3. Two light installation housings shall be located on each side of the coach front containing a single round halogen headlamp, a round LED daytime running light inboard of each headlight and an amber clearance/turn signal light located outboard of each headlight.

M.66.1.4. Amber colored turn signal lamps shall be provided on both the front and rear of the coach. All lighting shall meet Federal standards (including amended 49 CFR Part 571 effective December 26, 1984). The front right lamp shall be near the front wheel well, above the rub rail line and no higher than the wheel well. The front left side lamp shall be located at the same height and forward position as the right. The side signal lamps shall be of the armor protected type with unobstructed amber lens. The rear side signal lamps shall be generally located in the vicinity of the rear wheel well and shall have amber lenses.

M.66.1.5. LED roof marker lamps shall be provided at each end of the coach with amber front and red rear lens being provided. Intermediate LED marker lamps with amber lenses shall be provided on each side of the roof line at the center of coach.

M.66.1.6. Reflectors on the sides and rear of coach shall be provided. The front and center side reflectors shall be amber. The rear side and rear reflectors shall be red. The reflectors shall be permanently affixed to the coach; glue on or pressure sensitive mountings are not acceptable.

M.67. SERVICE AREA LIGHTING
M.67.1. Four lamps shall be provided in the engine compartment to generally illuminate the area for night emergency repairs or adjustments. The lamps shall be controlled by a switch located near the rear start controls in the engine compartment. These lamp assemblies shall be adequately sealed to prevent the intrusion of moisture or debris during coach operation or normal servicing operations such as steam cleaning. Necessary lights, also sealed, shall be located in other service compartments, and shall be provided with maintain contact switches on the light fixture or convenient to the light.

M.68. FLUSH MOUNTED CURB LIGHTS

M.68.1. Flush-mounted curb lights shall be installed on the right hand curbside of the coach. One light shall be installed in the no.1 baggage bay door, two shall be installed on the wheelchair lift door and one shall be mounted in the right hand rear engine service door.

M.68.2. The curb lights shall illuminate the curbside area the coach when the entrance door is opened, activated through the door control relay.

M.68.3. The lights shall extinguish automatically approximately 10 seconds after closing the entrance door. The curb light in the no. 1 baggage bay door shall extinguish when the baggage bay door is opened.

M.69. DRIVER’S LIGHTING

M.69.1. The driver’s area shall have a lamp to provide general illumination of the driver’s area and shall illuminate the half of the steering wheel nearest to the driver. This lamp shall be controlled by a switch that is conveniently located for access by the driver.

M.70. PASSENGER INTERIOR LIGHTING

M.70.1. Indirect interior illumination of the coach shall be provided by a minimum total of twenty-one (21) fluorescent tubes controlled by a switch on the driver’s left hand control panel. Lighting intensity, measured at a vertical plane 24 inch (610 mm) above the seat cushion, shall be a minimum 15 foot-candles. LED lighting providing equivalent illumination may also be used.

M.70.2. All passenger seats except for center seat of rear cross seat shall have a flush mounted adjustable LED light. A minimum of 6 candlepower will be provided by each reading light cluster to insure adequate visibility with a button for passenger control. A switch to test the function of the reading lamps shall be provided and be labeled “Test.” This switch shall be wired so as to override the function of all passengers reading lamp switches and illuminate all reading lamps when it is moved to the test position.

M.70.3. A minimum of six blue LED aisle lights shall be provided on the underside of the street side passenger seats. These lamps shall be mounted in such a manner so as to prevent passengers from damaging the light’s when they are illuminated.

M.70.4. Additional general lighting required to illuminate the interior for passenger exits and shall be interlocked to activate only when the passenger door is opened.

M.70.5. A step well lighting system shall be wired to illuminate when the front door is opened. The system shall provide no less than 2 foot-candles of illumination of the step treads with the doors open. These lights shall not glare in the passengers’ eyes. Lamp fixtures shall be totally enclosed, splash-proof, designed to provide ease of cleaning as well as lamp and housing removal, and shall not be easily removable by passengers. Step well lamps shall be protected from damage caused by passengers kicking lenses or fixtures and shall not be a hazard to passengers.

M.70.6. Three lamps shall be provided; a dome at the top of the step well, one on each side of the step well with the bottom one to also provide illumination of the ground area located inside and above the entrance door.

M.71. DRIVER CONTROLS

M.71.1. All switches and controls necessary for the operation of the coach shall be conveniently located in the driver’s area and shall provide for ease of operation. Switches and controls shall be essentially within the hand reach envelope described in SAE Recommendation Practice, J287, Driver Hand Control Reach. Controls shall be located so that boarding passengers may not easily tamper with control settings.

M.71.2. The door control, kneel control, windshield wiper/washer controls, and run switch shall be in the most convenient driver locations. They shall be identifiable by shape, touch, and markings. The passenger entrance door shall be operated by a single control, conveniently located by the driver’s left hand on the control console. The location of this control shall be easily determined by position and touch.

M.71.3. All switches and controls shall be marked with easily read identifiers. All panel-mounted switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from the vestibule or the driver’s seat.

M.71.4. A momentary engine overrule switch shall be provided on the driver control console to permit the driver to move the coach off the road. All labeling of controls shall be permanent.
M.71.5. A rotary ignition selector switch shall be provided.

M.72. LEFT HAND CONTROL CONSOLE

M.72.1. A control console shall be located immediately to the driver’s left and directly under the driver’s window. The console shall house the rotary master/run control switch, outside mirror touchpad controls, engine override switch, auxiliary heater switch, hazard light switch, entrance door switch, kneeling switch, engine brake switch, passenger chime switch, and hazard switch. All switches shall be multiplexed and LED back-lit wherever possible.

M.73. TRANSMISSION SHIFT SELECTOR CONTROL

M.73.1. The Allison Transmission Gen IV shift selector control shall be located on the left hand control console. Shifting is totally automatic using the touch pad on the shift selector control module. Fault codes are also displayed on the shift selector to identify potential problems detected by the transmission’s built-in diagnostics.

M.74. ACCELERATOR, BRAKE PEDALS AND ENGINE CONTROLS

M.74.1. These controls shall be designed for ankle motion. Foot surfaces of the pedals shall be faced with wear-resistant, nonskid, replaceable material that is either slipped or glued for grip. Controls for engine operation shall be closely grouped within the driver’s compartment.

M.75. INSTRUMENTATION

M.75.1. The speedometer, air pressure gauge(s), and certain indicator lights shall be located on the front dash panel immediately ahead of the steering wheel. The steering wheel spokes or rim shall not obstruct the driver’s vision of the instruments when the steering wheel is in the straight-ahead position. Instrument panel gauges and switches shall be illuminated when the exterior marker lamps are turned on. 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.

M.75.2. Indicators/telltales immediately in front of the driver shall at a minimum include:

M.75.2.1. Headlamp High Beam
M.75.2.2. Right Turn
M.75.2.3. Left Turn
M.75.2.4. Hazard Warning
M.75.2.5. Parking Brake applied
M.75.2.6. Service Brakes applied (may be common with parking brake indicator – Tell Tale labeled “Stop Lights.”)

M.75.3. The instrument panel shall include a speedometer indicating no less than 80 mph (130 kph) and calibrated in maximum increments of 5 mph (5 kph). The speedometer shall be a rotating point type, with a dial deflection of 240° to 120° and 45 mph (73 kph) near the top of the dial. The speedometer shall be sized and accurate in accordance with SAE Recommended Practice J678. A programmable electronic speedometer, or approved equal with odometer indicating vehicle speed in miles per hour, between 0 mph and 80 mph, shall be supplied. Speedometer speed and odometer mileage readings must be accurate within limits of plus nothing to minus 2% when coaches are equipped with new tires. The speedometer shall be equipped with an odometer with a capacity reading no less than 999,999 miles or kilometers.

M.75.4. The instrument panel shall also include air brake reservoir pressure gauge(s) with indicators for front and rear air tanks and voltmeter(s) to indicate the operating voltage across the coach batteries. The instrument panel and wiring shall be easily accessible for service from the driver’s seat or top of the panel. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.

M.76. VISUAL AND AUDIBLE WARNING DISPLAY

M.76.1. Critical systems or components shall be monitored with a built-in diagnostic system. This diagnostic system shall have visual and audible indicators. The diagnostic indicator lamp panel shall be located in clear sight of the driver and shall incorporate LED telltale lights. 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. An audible alarm shall sound when certain malfunctions are detected by the diagnostic system. The audible alarm shall be loud enough for the driver to be aware of its operation. Malfunction warnings and other indicators listed in Figure 2 shall also be supplied on the coach. Space
shall be provided in the telltale clusters for future additions of no less than 4 indicators as the capability of onboard diagnostic systems improves.

**M.76.2.** Figure 2

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Status</th>
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<tbody>
<tr>
<td>BACK-UP INDICATOR (A)</td>
<td>BACK-UP ALARM</td>
</tr>
<tr>
<td>CHECK ENGINE INDICATOR</td>
<td>NONE</td>
</tr>
<tr>
<td>CHECK TRANSMISSION INDICATOR</td>
<td>NONE</td>
</tr>
<tr>
<td>ANTILOCK CONDITION LAMP</td>
<td>NONE</td>
</tr>
<tr>
<td>NOT GENERATING</td>
<td>NONE</td>
</tr>
<tr>
<td>HAZARD INDICATOR</td>
<td>CLICK</td>
</tr>
<tr>
<td>HEADLIGHT HIGH BEAM INDICATOR HOT</td>
<td>NONE</td>
</tr>
<tr>
<td>ENGINE INDICATOR (B)</td>
<td>BUZZER</td>
</tr>
<tr>
<td>KNEEL INDICATOR</td>
<td>SONALERT</td>
</tr>
<tr>
<td>LEFT TURN SIGNAL INDICATOR</td>
<td>CLICK</td>
</tr>
<tr>
<td>LOW AIR INDICATOR</td>
<td>BUZZER</td>
</tr>
<tr>
<td>LOW OIL PRESSURE INDICATOR (B)</td>
<td>BUZZER</td>
</tr>
<tr>
<td>LOW COOLANT INDICATOR (B)</td>
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</tr>
<tr>
<td>PARKING BRAKE INDICATOR RIGHT</td>
<td>NONE</td>
</tr>
<tr>
<td>TURN SIGNAL INDICATOR STOP</td>
<td>CLICK</td>
</tr>
<tr>
<td>ENGINE INDICATOR</td>
<td>NONE</td>
</tr>
<tr>
<td>STOP REQUEST INDICATOR</td>
<td>CHIME</td>
</tr>
<tr>
<td>WHEELCHAIR LIFT INDICATOR WHEELCHAIR</td>
<td>BUZZER/ALARM</td>
</tr>
<tr>
<td>STOP REQUEST INDICATOR</td>
<td>CHIME</td>
</tr>
<tr>
<td>REAR RISE INDICATOR</td>
<td>SONALERT</td>
</tr>
</tbody>
</table>

**M.77.** INTERIOR TRIM

**M.77.1.** GENERAL REQUIREMENTS

**M.77.1.1.** The interior trim shall be generally pleasing, 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. To the extent practicable, all interior surfaces more than 10 inches (254 mm) 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. Handholds, lamps, air vents, armrests, and other interior fittings shall appear to be part of the coach interior design. There shall be no sharp, abrasive edges and surfaces and no unnecessary hazardous protuberances. All plastic and synthetic materials used inside the coach shall be fire-resistant.

**M.77.1.2.** Materials shall be selected on the basis of maintenance, durability, appearance, flammability, and tactile qualities. Trim and attachment details shall be kept simple and unobtrusive. 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 under normal operational conditions.

**M.78.** TRIM PANELS

**M.78.1.** Interior side trim panels and driver's barrier shall be textured stainless steel, anodized aluminum, plastic, melamine type material, vinyl-clad aluminum or fiberglass reinforced plastic. The material shall permit easy removal of paint, greasy fingerprints, and ink from felt tip pens. Panels shall be easily replaceable and tamper resistant. They shall be reinforced, as necessary, to resist vandalism and other rigors of commuter coach service. Interior mullion trim, molding, and trim strips shall be textured stainless steel, vinyl-clad aluminum, anodized aluminum or vacuum formed plastic.

**M.78.2.** The lower sidewall interior trim shall be fabric covered aluminum panels or approved equal, with fabric patterns running horizontally. Panels shall be sectionalized for ease of repair and joined by aluminum extrusion. Ceiling panels shall be vinyl-clad aluminum or approved equal.
M.79. HEADLINING
M.79.1. 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 frame members. Molding and trim strips, as required to make the edges tamper-proof, shall be stainless steel, aluminum, or plastic, colored to compliment the ceiling material. The access panel for the antenna base does not require to be hinged but shall be mounted with tamper-proof screws. Materials for the headlining shall typically be vinyl clad aluminum; the front interior cap shall be gray fiberglass or ABS.

M.80. FRONT END
M.80.1. The entire front end of the coach shall be sealed to prevent debris accumulation behind the dash and to prevent the driver from kicking or fouling wiring and other equipment with his feet. The front end shall be free of protrusions that are hazardous to passengers standing or walking in the front of the coach during rapid decelerations. Formed metal dash panels shall be painted and finished to exterior quality or may be ABS, fiberglass or vinyl-clad. All parts forward of the driver's barrier shall be finished with a dull matte surface. Colors shall match or coordinate with the balance of the coach interior.

M.81. REAR END
M.81.1. The rear bulkhead and rear interior surfaces shall be paneled with fiberglass reinforced plastic, trimmed with stainless steel, aluminum, vinyl-clad aluminum, or approved equal.

M.82. PASSENGER SEATS
M.82.1. ARRANGEMENTS
M.82.1.1. Passenger seats shall be arranged in a transverse, forward facing configuration. Ambulatory passenger capacity shall accommodate 57 seats. An option for a lavatory and lavatory retention tank shall be provided, the lavatory should not displace more than 2 passenger seats. Both configurations will need an attached floor plan.
M.82.1.2. No more than twelve seated positions shall be lost on any bus configuration to accommodate two wheelchair passengers occupying the securement positions.
M.82.1.3. Each transverse, forward facing seat, except the rear seats, shall accommodate two adult passengers. Floor seat tracks shall be stainless steel and shall be welded to the coach frame and be nearly flush with the finished floor. The wall tracks shall be stainless steel or aluminum and shall be bolted or riveted to the sidewall.
M.82.1.4. The vendor shall provide the buyer with an option for self-retracting footrest.

M.83. STRUCTURE AND DESIGN
M.83.1. Seats shall be American Seating Model W2005SQ reclining seats or approved equal. Seat frames shall be constructed of high strength, fatigue resistant, welded steel with a durable powder coated, corrosion resistant colored finish which complements the coach interior. The seat frame shall be wall mounted with heavy gauge steel brackets and shall be attached to the coach floor with a heavy duty stainless steel T pedestal. The seat back shall recline five (5) inches (127 mm) maximum with an infinite number of stops. The reclining seat backs shall be provided with a dress up feature to facilitate coach cleaning. Seat width shall be nominal 40.50 inches (1,029 mm). Aisle shall not be less than 14 inches (356 mm) wide.
M.83.2. Seat cushions shall be supported by steel serpentine springs. Seat covering shall be Holdsworth, Lantal, or similar high quality wool fabric. Typical seat covering weight shall be 24 ounces (680 g)/square yard. Overall composition shall typically be 54% wool, 9% nylon and 37% cotton. Pile composition shall typically be 65% wool and 15% nylon. Backing composition shall typically be 100% cotton. Abrasion from a 28 ounce (794 g) loading shall not affect appearance with 60,000 rubs. The front face of the seat upright and side boxing of cushions shall be covered with Holdsworth, Lantal or other similar wool fabric to compliment the seat cushion. Backrest fabric shall be rugged carpet material. Seat armrest shall be dark gray in color.
M.83.3. Seat foam padding shall be polyurethane. Seat upholstery shall utilize zippers or Velcro which allows them be removed from the seat cushions for cleaning/replacement purposes.

M.84. DRIVER'S SEAT
M.84.1. DIMENSIONS
M.84.1.1. The driver’s seat shall be an air ride Recaro Ergo Metro or approved equal. The driver's seat shall be adjustable and shall have up to 9.05 inches (230 mm) of fore and aft adjustment. The
seat back and cushion shall be adjustable. The seat shall have cushion depth adjustment, height adjustment (5.5 inches (140 mm) maximum), seat back adjustment, rear cushion adjustment and lumbar adjustment so that operators ranging in size from the 98th percentile male to the 5th percentile female may operate the coach. The suspension control shall be ergonomically designed so that the operator can adjust the seat without looking. The suspension height adjustment and lumbar switches shall be operated with a rocker switch, no rotating knobs are acceptable. The seat suspension shall be capable of dampening varying frequencies that are transmitted through the vehicle caused by varying road conditions. The seat shall be cushioned by a dual shock absorber design. One shock shall be adjustable to allow the operator to control the ride settings. A rubber bumper is required to prevent bottoming out of the seat.

M.84.1.2. A rubber boot shall be provided to cover the suspension to eliminate the potential for pinching. All air lines are to be 0.25 inch (6 mm) diameter and have a quick disconnect at the back of the seat.

M.84.1.3. The suspension shall have a minimum of 15 degrees of seat cushion tilt (rake adjustment). The rake adjustment shall be dual-sided and be accomplished without leaving the seat. The seat cushion shall adjust from 18-20 inches (457 – 508 mm) for varying size drivers. Double locking seat tracks with stainless steel bearings shall be provided. The seat tracks shall be located below the seat cushion and above the pneumatic suspension to enhance track durability and improve rearward travel. The seat shall come equipped with an air track release and a manual center release. All controls are to be on the right-hand side of the seat.

M.84.1.4. The seat shall be equipped with manual dual recliner gears. The seat back shall be adjustable with dual sided hand controls and include a 24.5 degree recline stop. Recline stop is to prevent the seat from interfering with the driver’s barrier. The seat back shall be infinitely adjustable from 90 to 114.5 degrees. The seat back shall come with a full protective plastic back shell.

M.84.1.5. The back structure shall be constructed of steel and include a one piece stamped steel shell. The seat back shall be ergonomically designed and adjustable to provide exactly the right support to match the S-shaped curve of the operators back. The seat back foam shall be fully supported, no wires or spring support is to be provided. Solid steel bolster adjustment supports are required to provide strong lateral supports. Lateral supports will help hold the driver in place and reduce muscle fatigue while driving.

M.84.1.6. The seat cushion shall be adjustable in length and rake to accommodate operators of various heights. The seat cushion shall have a two inch extension for taller operators. To accommodate shorter operators, the front of the seat cushion shall rake down and retract.

M.84.1.7. A three cell air lumbar with right hand controls shall be provided for lower back support. Each air bag shall be individually controlled. Switch design and layout shall be positioned so that the operator can adjust without looking. A four way adjustable headrest with six position vertical adjustment shall be provided. The seat shall be provided with a two point 72 inch (1.8 m) seat belt that is stored in plastic anti-cinch automatic retractors mounted on the left side of the seat. The seat belt buckle shall be located on the right hand side of the seat for easy access.

M.85. STRUCTURE AND DESIGN

M.85.1. The driver's seat cushion shall be made of polyurethane foam. The foam shall be constructed to provide lateral support to provide better operator stability in curves and turns. All exposed metal on the driver's seat, including the pedestal, shall be unpainted aluminum or stainless steel. Required seat belts shall be fastened to the seat so that the seat may be adjusted by the driver without resetting the seat belt. Seat belts shall be stored in automatic, inertia locking type retractors that do not tighten up during operation. The retractor shall be located to the left of the driver; the latch mechanism shall be located on the right. The seat belt shall be designed to allow the operator to "set" the tension on the belt. The belt shall be designed to not creep, making the belt tighter or loose. The seat belt shall be long enough to secure a 98% male driver.

M.85.2. Driver's seat covering weight shall be 24 ounces/square yard. Overall composition shall be 54% wool, 9% nylon and 37% cotton. Pile composition shall be 85% wool and 15% nylon. Back composition shall be 100% cotton. Seat cushions shall withstand 100,000 randomly positioned 3.50 inch (89 mm) drops of a squirming, 150 pound (68 kg), smooth surfaced, buttocks-shaped striker with only minimal wear on the seat covering.

M.86. FLOOR COVERING

M.86.1. VESTIBULE
M.86.1.1. The floor in the vestibule shall be covered with RCA flooring or approved equal. The floor covering shall remain effective in all weather conditions for a minimum of seven years. The floor covering as well as transitions of floor material to the main floor and to the step well area, shall be smooth and present no tripping hazards. The standee line shall be white and 2.0 inches (51 mm) wide and shall extend across the coach ramp aisle in line with the driver's barrier. The width of this line shall be uniform in width across its entire length. This line shall be white, same color as the edge of the steps. Color shall be consistent throughout the floor covering.

M.86.1.2. Flooring shall be smooth in driver area, isle and under seats

M.87. DRIVER’S COMPARTMENT

M.87.1. The floor in the driver's compartment shall be easily cleaned and shall be arranged to prevent debris accumulation. Floor covering material, dimensions and color shall match the vestibule area of the bus.

M.88. PASSENGER AREA

M.88.1. The floor covering in the passenger area shall be the same material, dimensions and color specified for the vestibule. Flooring shall be installed to minimize the quantity of seams. A one-piece aisle center strip shall extend from the rear cross seat running between the rows of transverse seats to the edge of the center ramp. The ramp will include a separate piece of flooring with a standee line imbedded next to the driver's modesty panel. The floor under the seats shall closely fit to the sidewall panels.

M.89. WINDOWS

M.89.1. WINDSHIELD

M.89.1.1. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the coach. When the coach is operated at night with the passenger interior lighting on, essentially no reflections shall be visible in the windshield immediately forward of the driver's barrier. Reflections in the remainder of the windshield shall be minimized, and no reflection of any part of the coach interior behind the driver's barrier shall be visible in the windshield.

M.89.1.2. The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded windshields shall not be used. The glazing material shall have single density tint.

M.90. DRIVER’S SIDE WINDOW

M.90.1. The driver's side window section shall be divided vertically and the rearward section shall slide fore and aft in tracks or channels designed to last the service life of the coach. The driver's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall be nominal 0.25 inch (6 mm) laminated, tempered glass with single density tint, the same as the windshield. The side window shall be rated AS-2.

M.90.2. Driver/Entrance door shall be double glazed on sash area

M.91. PASSENGER SIDE WINDOWS

M.91.1. Eight large rectangular passenger side windows shall be provided on each side of the 45 foot coaches. The glazed panel outside dimension size will be 36.125 x 57.625 inch (918 x 1466.5 mm) x .188-inch (4.76-mm) thick. The windows will have a nominal 32 x 52-inch (813- x 1,321-mm) clear opening within the inner support frame structure. The side passenger windows will be single-glazed construction, hermetically sealed, AS-3 laminated float, 76% heat-absorbing laminated safety glass with light and solar transmittance of 24%. A painted aluminum sash molding will be installed along the bottom length of the passenger side windows.

M.91.2. All windows shall be top hinged with push out at the bottom, with the exception of the wheelchair lift door and lavatory windows which do not open. All top-hinged windows shall be emergency escape type and include a single motion release bar running the entire width of the window at the lower edge to permit emergency egress. Emergency operating instructions printed on metal plates shall be provided at each seat position for operating the push-out window.

M.91.3. Vendor shall provide to buyer an option and variety of blinds for passenger windows. An option for window lights shall be provided also.

M.92. INSULATION

M.92.1. MATERIAL

M.92.2. PROPERTIES

M.92.3. The insulating materials may be of differing thicknesses and materials to achieve thermal insulating properties and low interior noise levels. These are described following:

OMES/PURCHASING
M.92.3.1. Roof: 2.0 inch (51 mm) thick, compressed at installation, resin coated, medium density non bagged fiberglass

M.92.3.2. Sidewall: Rigid molded polyurethane foam of varying thickness.

M.92.3.3. Driver’s area: Minimum 0.50 inch (13 mm), high-density fiberglass under the floor in the driver’s area.

M.92.3.4. Step well area: 1-inch thick urethane foam insulation with stretched polyester film to minimize interior temperature variances during severe external climatic conditions and for sound deadening.

M.92.3.5. Below windshield: 2.0 inch (51 mm) thick, high density fiberglass

M.92.3.6. Complete rear lounge seat area shall be heavily insulated with fiberglass blankets and sound-dampened panels for both noise and heat protection as follows:

M.92.3.7. Behind the rear cross-seat riser and rear cross seat back and cushion are a minimum total of 1.50 inch (38 mm) thick high-density fiberglass blankets.

M.92.3.8. An additional 0.625 inch (16 mm) fiberglass blanket is added behind the rear cross seat back to further impede engine noise propagation to coach interior.

M.92.3.9. Sound barrier with 0.250 inch (6 mm) urethane foam layered on either side of a 0.125 inch (3 mm) urethane elastomer loaded with barium sulfate.

M.92.3.10. Cover panel behind rear cross-seat is 1.0 inch (25.4 mm) thick foamed polyurethane with stretched polyester film facing.

M.92.3.11. Area behind and below this rear area is 2.0 inch (51 mm) medium density fiberglass with a 0.75 inch (19 mm) thick heavy density fiberglass batting cemented to the inner face of the fiberglass rear panel.

M.93. THERMAL INSULATION

M.93.1. The combination of inner and outer panels on the sides, roof, and ends of the coach, and insulating materials shall provide a thermal insulation sufficient to meet the interior temperature requirements. The coach body shall be thoroughly sealed so that drafts cannot be felt by the driver or passengers during normal operations with the passenger doors closed.

M.94. SOUND INSULATION

M.94.1. 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 coach shall have a sound level of 60 dBA or less at any point inside the coach. These conditions shall prevail with all openings, including doors and windows, closed and with the engine and accessories switched off.

M.94.2. Bus generated noise level experienced by a passenger at any seat location in the coach shall not exceed 80 dBA and the driver shall not experience a noise level of more than 70 dBA under the following test conditions. The coach 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 coach 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 coach path. During the test, the ambient noise level in the test area shall be at least 10 dB lower than the coach under test. Instrumentation and other general requirements shall conform to SAE Standard J366. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured.

M.95. REAR SEAT INSULATION

M.95.1. Special design consideration shall be given to insulation in the area above the engine compartment. Fiberglass or other suitable material shall be applied, together with adequate ventilation, to provide temperatures consistent with the remainder of the coach.

M.95.2. Seat cushions and seat backs shall be suitably insulated to prevent elevated temperature of the seat itself and no cushion or back shall be measurably hotter as compared to any other seat in the coach.

M.96. ANCILLARY FEATURES

M.96.1. DRIVER'S AREA

M.96.2. VISORS

M.96.2.1. Three roller type sunscreens shall be provided at the right and left hand windshield and at the driver’s side window. Guide rods shall be located at each end of each screen to allow for
infinite positioning. The sunscreens shall be shaped to minimize light leakage between the
sunshades and windshield pillars. The sunscreens shall not obstruct air flow from the climate
control system or obstruct the operation of other equipment such as the radio handset or the
destination sign control. Sunscreen adjustments shall be made easily by hand.

M.97. STOP REQUEST SIGN

M.97.1. A passenger chime signal audible to the driver and to passengers anywhere inside the coach shall be
provided. The chime shall be a push button convenient to seated passengers. A driver-controlled switch
shall deactivate the chime system. A stop request sign shall be located in the front center of the coach and
fastened to the coach ceiling to permit viewing by all passengers. The sign shall be illuminated when the
passenger chime sounds and go off when the entrance door is opened. The passenger chime shall
sound once when the sign's light comes on but will not sound again until after the system has been reset
by the opening of the entrance door. A passenger chime circuit ON / OFF switch shall be provided in the
drivers area.

M.98. DRIVERS STORAGE

M.98.1. A hook shall be provided for the drivers' coat in the driver's area.

M.99. MIRRORS

M.99.1. OUTSIDE MIRRORS

M.99.1.1. The coach shall be equipped with corrosion resistant, heated remote controlled outside
rear view mirrors, on each side of the coach. The mirrors shall be mounted so as to permit the
driver to view the highway along both sides of the coach, including the rear wheels. Mirrors shall be firmly attached to the coach to prevent vibration and loss of adjustment, but not
so firmly attached that the coach or its structure is damaged when the mirror is struck in an
accident. Outboard maximum overall mirror width dimension shall not exceed 122 inches while
providing maximum visibility to the operator.

M.99.1.2. The roadside mirror shall be a corrosion-resistant, remote outside rear view mirror, adjustable
from the driver's seat. Mirrors shall be split view flat and convex glass integrated in the same
housing, overall measurement 10 inches by 13 inches (254 x 330 mm). Mirrors shall permit
operator view of road surface as well as the rear wheels. Connections on mirror harness shall be
Cannon Sure Seal all weather connectors or approved equal. Mirror head shall be attached to
arm with ball/collet adjustment, for positive head location. Mirror arm shall be made to breakaway
if struck in an accident or to eliminate damage in bus wash. Mirror arm shall be hollow aluminum
for concealing wire.

M.99.1.3. The curbside mirror shall be a corrosion-resistant remote outside rear view mirror. Mirrors shall
be integral flat and convex with overall measurements of 10 inches by 13 inches (254 x 330 mm)
and permit driver view of roadway as well as coach rear wheels. Mirror arm shall be spring
loaded to break away, should impact occur. Mirror arm shall be made to break away if struck in an
accident or to eliminate damage in bus wash. Mirror arm shall be hollow aluminum for
concealing wire. A mechanical stop shall be provided which prevents contact between the mirror
arm and the entrance door. Mirror arm shall also have a five inch convex spot mounted on it to
provide a clear view of the front of the coach.

M.99.1.4. Both mirrors in both housings shall be heated. A switch shall be provided. The switch shall
control both mirrors and be provided with pigtail connectors to interface with the wiring harnesses
of both remote mirrors. The switch shall be installed in a location that is within easy reach of the
operator.

M.100. INSIDE MIRRORS

M.100.1. A mirror shall be provided for the operator to observe passengers throughout the coach 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 rear of the coach and anywhere in the aisle. Inside
mirror shall be 6.0 inches x 10.50 inches mounted just below the destination sign box and above the
driver's line of sight.

M.101. PASSENGER ASSISTS

M.101.1. GENERAL REQUIREMENTS

M.101.1.1. Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for
the support and stability 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 coach, a horizontal assist shall be provided at the aisle side of the luggage rack that runs the full length of the luggage rack so that a 5th-percentile female passenger may easily move the length of the aisle using one hand and then the other without losing support. Excluding those mounted on the luggage racks, the assists shall be between 1.25 and 1.50 inches (32 x 38 mm) in diameter or width with radii no less than 0.25 inches (6 mm). All passenger assists except for the luggage rack nosing shall permit full hand grip with no less than 1.50 inches of knuckle clearance around the assist.

M.102. FRONT DOORWAY

M.102.1. Front doors, or the entry area, shall be fitted with assists no less than 0.75 inches (19 mm) in width. Assists shall be as far outward as practicable, but shall be no further than 6 inches (152 mm) from the outside edge of lower step tread 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 on the front modesty panel.

M.103. VESTIBULE

M.103.1. The aisle of the driver's barrier panel shall be fitted with vertical passenger assists that are functionally continuous with the overhead assists that extend to within 36 inches (91 cm) of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm and shall be in complete compliance with ADA requirements.

M.103.2. A horizontal passenger assist shall be located in the front of the coach adjacent to the driver's area. The horizontal passenger assist maximum will be no more than 35 inches (89 cm).

M.103.3. The assists at the front of the coach shall be arranged to permit a 5th percentile female passenger to easily reach from the front door assist to the horizontal assist, then to the vertical assist.

M.104. PASSENGER INFORMATION SYSTEMS

M.104.1. DESTINATION SIGNS

M.104.1.1. The displays shall consist of Full Colored LED’s. All Full Color LED’s used for the destination signs shall be rated for a 50,000-hours. The entire display area of all signs shall be clearly visible and readable both in direct sunlight and at night with a viewing angle of at least 140 degrees. The characters formed by the LED’s shall meet the requirements of the Americans with Disabilities ACT (ADA) of 1990 Reference 49 CFR Section 38.39. The software will give the end user the capability to select from a vast selection of custom fonts, pre-programmed fonts and the Microsoft TrueType Directory fonts for display on the LED Signs for the most customization possible to the desire of the end user’s riding public.

M.104.1.2. All destination signs shall be supplied with an ambient light detection sensor that controls the LED intensity according to the exterior light conditions. This adjustment shall be continuously linear, not stepped, from 10-100% output.

M.105. FRONT DESTINATION SIGN

M.105.1. Front Sign shall consist of a minimum matrix of 160 Columns by 17 Rows and shall be full color LED. The sign should be readable from at least 250’ with a viewing angle of not less than 140˚.

M.106. CURB SIDE DESTINATION SIGN

M.106.1. Not required

M.107. SYSTEM CONTROL AND PROGRAMMING

M.107.1. All system control and drive PC boards shall be enclosed in either the sign housings or in the System Control Console. The various destination signs can be programmed to display either one common message or each sign can display an independent message. The System Control Console shall incorporate a flexible keypad with no moving parts.

M.107.2. The system control console shall be used to view display messages and contain the destination sign database. The driver console shall utilize a tactile membrane keypad. The system control console shall be equipped with an LCD display.

M.107.3. Sign system shall be capable of sequentially displaying a minimum of one pre-selected destination message and one public relations message. The operator shall be able to quickly change between pre-selected destination messages without re-entering a message code. Public relations messages shall be capable of being displayed alternately with the regular destination.
M.107.4. The Master Coach Run Switch shall control power to the sign system. 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 a bus environment.

M.107.5. The system control console shall be used to view and update display messages. The system control console shall utilize a multiple function keyboard with tactile feel, designed especially for the harsh transit environment. The system control console shall contain an LCD display. The system control console shall continuously display the complete message associated with the selected destination code. Diagnostics and/or maintenance and test features that indicate any sign defects shall be included.

M.107.6. The system shall be capable of integrating to on-board computer devices for message listing program via anyone of several possible protocols, including but not limited to J1708, RS485, RS232, RS422 or IBIS. The sign system shall be capable of wireless upload capability for receiving the messaging database. The sign system shall be reprogrammable through the system control console by either a standard USB Thumb Drive or via a 9-pin “D” type keyfob memory device.

M.108. EMERGENCY MESSAGE DISPLAY

M.108.1. A pre-programmed emergency message may be activated using a customer-selected switch located in the driver area. This message shall be displayed on signs facing outside the vehicle, while signs inside the vehicle, including the driver console, remain unchanged. Removing the emergency signal or entering a new destination shall cancel this message.

M.109. SYSTEM LEVEL DIAGNOSTICS

M.109.1. The system control console shall provide, at a minimum, visual indication of system level errors with the destination signs. This shall include detection of communication failure, power supply failure on a particular sign and display board failure on a particular sign.

M.109.2. A multiplex system with diagnostic shall be provided.

M.110. PROGRAMMING

M.110.1. A PC-based software package will be furnished for creating the destination sign messages. The character shape and size shall be programmable and the software should allow the creation of personalized fonts. These may vary in pixel height and comprise single, double and triple stroke typeface. The program will allow an unlimited amount of special characters, logos or fonts to be displayed.

M.110.2. A programming software package shall be furnished to generate message lists for the destination sign system. It shall be a Windows compatible software package, using drop down menus and help screens. The software shall not require a standalone computer or a computer of a specific make or model. The software will allow, at a minimum, individual font selection, shape and choice of fonts, font creation and import, destination display management (right or left route numbers, pre-defined text fields, alternating screens and scrolling), as well as full system previews are available for all signs. The software shall also offer utilization of the TrueType font directory for programming. Graphic capabilities are available to allow personal logo creation as well as selection from pre-programmed pictograms.

M.110.3. The programming software shall use techniques that require minimal operator training and are intended for use by operators that are not trained in complex computer operations.

M.111. WARRANTY & SPARES

M.111.1. All full color signs and components of the sign system shall be covered by a 5-year warranty. Free spare parts, (whole components), shall be provided to the end user free of charge for storage and use at the end users selected facility. The number of spares to be provided will be commensurate with the number of original systems purchased and shall be agreed to by all parties at the execution of a contract.

M.112. LIFT

M.112.1. A Braun model number NUVL855RM24 dedicated access extended travel lift, or approved equal with two forward facing mobility device securement areas to accommodate a maximum 30.0 inches (762 mm) wide mobility device shall be provided. The lift assembly shall comply with all current ADA and FMVSS 403 and 404 requirements. The lift shall be installed below the floor line at the number 2 right-hand luggage bay on the curbside of the coach.

M.112.2. The lift shall be controlled by a dash mounted toggle switch and a rear lift area toggle switch, and operated by up/down switches on a pendant mounted to the lift support bracket inside the number 2 baggage bay. The lift Restraint Belt must be buckled before the lift can be raised or lowered. The safety interlock circuit can be energized to operate the lift only if: the transmission is in neutral, the park brake is applied, engine Fast Idle is ON, the dash-mounted Master Switch is ON, the lift Secondary Switch is ON and the lift restraint belt is buckled.

OMES/PURCHASING
M.112.3. The wheelchair loading system shall provide safe, comfortable and rapid ingress and egress for applicable passengers from the street level or a curb. When not in use, the lift shall stow in the luggage bay. The lift mechanism shall include a Threshold Warning device to provide “passenger on platform” information and prevent stowing the lift platform when a passenger is sensed. The outer barrier shall be automatically controlled and shall be such that it cannot be overridden by the loading system operator. A dash mounted indicator light shall be provided and shall be illuminated when the loading system is activated. The interlock shall apply, the bus shall not move and the engine throttle shall be disabled whenever the wheelchair loading system is activated. If the lift door is open or ajar, the interlock shall remain engaged. Brackets, clamps, screw heads and other fasteners used on the passenger assists shall be anodized aluminum or stainless steel and shall be flush with the surface and free of rough edges.

M.112.4. A manual wheelchair door shall be provided.

M.112.5. The lift control mounted on the lift structure shall have push button Up / Down switches. The toggle electrical supply switch shall be located in close proximity to the controller. This toggle switch must be turned “ON” prior to the lift operation. All lift control switches shall be permanently labeled. Decals shall not be permitted. The stow guard switch shall be red in color and the Stow / Deploy switch shall be black in color. These switches shall be incorporated in a hand held pendant

M.112.6. The Braun NUVL855RM24 or approved equal lift shall include the following specifications:

M.112.6.1. Lifting capacity (main platform) - 700 pounds (317 kg)
M.112.6.2. Vertical travel - 63” (1,600 mm) maximum
M.112.6.3. Platform width (chair capacity) 30” (762 mm) minimum
M.112.6.4. Platform depth (chair capacity) - 48” (1,219.2 mm) minimum
M.112.6.5. Platform side height - 1.50” (38 mm)
M.112.6.6. Handrail height - two (2) - 30” (762 mm) minimum
M.112.6.7. Cassette stowed dimension (depth) - 72.25” (1835 mm) total
M.112.6.8. Cassette Width & Height - 43.5” x 8.375” (1105 x 213 mm)
M.112.6.9. Operating controls - 3 pushbutton
M.112.6.10. Power Source - Electro- hydraulic
M.112.6.11. Voltage - 24 volts
M.112.6.12. DC Back up system - Emergency hand pump
M.112.6.13. Construction - Steel and aluminum
M.112.6.14. Stow level to ground cycle time - 12 seconds at 70 degrees (21° C) no load
M.112.6.15. Ground to floor level cycle time - 12 seconds at 70 degrees (21° C) – no load
M.112.6.16. Hydraulic system fluid capacity - 1.0 quart (1 liter)
M.112.6.17. Hydraulic system operating pressure - 2500 psi (17,238 kPa) minimum

M.113. DEPARTMENT OF TRANSPORTATION REGULATIONS 49 CFR 38

M.113.1. The lift shall include a hinged platform to bridge the coach floor to the lift platform. Bridge shall be hinged and locked in an upward position to act as a barrier when the lift is in use. Bridge shall also allow the lift passenger to ingress/egress easily from the platform. Lift travel speeds and lift operation shall be adjusted to the lift manufacturer's specifications upon completion of the lift installation into each coach and before coach delivery. The individual handrails shall incorporate a visual aid to insure that they are folded in the proper order.

M.113.2. The lift shall include an emergency system in case of driver operation malfunction. Should an emergency situation occur, the lift operator shall release the pushbutton switch on the controller to immediately stop the lift operation. Loss of electrical power shall also stop the lift operation regardless of switch position. An emergency auxiliary hydraulic hand pump shall be used to complete the lift cycle. The emergency hand pump handles and pump shall be located in an enclosed box at the rear wall of the number 1 right-hand baggage bay to prevent the accumulation of dust and dirt. The pump shall be easily accessible through baggage bay door. The handle shall be stored adjacent to the pump to allow immediate usage.

M.114. LIFT DOOR

M.114.1. The lift door shall be a single leaf design that operates in a sliding track mounted both above and below the door leaf. The door shall open by sliding to the rear of the coach and shall remain on a horizontal
plane throughout the opening and closing process. No pin hinged doors shall be provided. The transmission must be in neutral and the parking brake activated for the lift to operate. The accelerator shall be automatically disabled and the fast idle system activated when either the lift master switch is turned "ON" or the lift door is open in order to provide maximum safety and security. These features shall be wired to the lift master switch to allow activation only when the transmission is in neutral. The coach directional (Hazard) lights will also flash on/off. After the lift operation is completed, the lift shall be properly stored and secured, with the access door closed and the lift master switch at the dash in the "OFF" position in order to move the coach.

M.114.2. The lift door shall have a window in line with the other passenger windows and shall not detract from the appearance of the coach. The door latch mechanism shall be located in the lower section of the door so that operators in the 5th percentile female range can operate the lift door.

M.114.3. The lift storage door shall not block the visual observation of the lift assembly while utilizing the manual override mode of the lift. A lift door design consisting of a horizontally hinged lift platform egress door mounted within a vertical motion pantograph baggage door is a preferred design.

M.115. LIFT INSTALLATION

M.115.1. The installation of the lift to the coach structure as well as the installation of the lift door into the sidewall of the coach shall not affect the structural integrity of the coach.

M.115.2. The parcel rack module above the wheelchair lift platform area shall be permanently removed to provide additional headroom. The modified rack shall be professionally finished at all ends.

M.115.3. A Threshold Warning module with a red warning light and acoustic sensor shall be mounted in the ceiling structure above the wheelchair lift entrance doorway.

M.115.4. The heating and air ducts shall be rerouted around the lift area to ensure proper interior air conditioning/heating airflow and distribution.

M.115.5. A passenger chime tape switch shall be mounted on the sidewall at the two (2) wheelchair securement positions.

M.115.6. Each coach shall have adequate information decals installed which details the proper lift operation in both the normal and manual modes of operation.

M.116. LIGHTING REQUIREMENTS

M.116.1. Lighting for the lift areas shall be designed to exceed ADA and FMVSS 404 standards. Lighting shall be provided to effectively illuminate the lift area. Light shall be wired through the lift master toggle switch on the driver's dash and shall automatically illuminate when this switch is in the "ON" position. The lighting design shall minimize the effect of glare on passengers entering the bus through the wheelchair lift door. During lift operation, the street surface shall be illuminated to a minimum of six candlepower a distance of 3 feet (.91 cm) beyond the external dimensions of the lift platform once deployed and lowered. Additional lighting shall be provided to insure illumination of the instruction placard and the manual override pump when it is in use.

M.117. SECUREMENT SYSTEM

M.117.1. The vehicle interior shall permit the securement of two (2) forward facing wheelchair passengers in which the primary position shall be on the street side of coach directly across from lift. Securement areas shall be a minimum 30 x 48 inches (762 x 1,219 mm) as required by ADA. Securement devices shall be QRT Deluxe Slide and Click or approved equivalent.

M.117.2. A separate three-point belt securement shall be provided to effectively secure wheelchair passengers.

M.117.3. To further secure the passenger during the lift operation, a retractable seat belt strap shall be provided at the ingress / egress area of the lift platform. This seat belt strap must be buckled to disengage the lift electrical interlocks to allow lift operation. A minimum 10.5 inches (267mm) high barrier shall also be provided at the rear of lift area for additional passenger protection.

M.118. ROOF VENTILATORS/ESCAPE HATCHES

M.118.1. Two roof ventilators shall be provided and designed to perform as escape hatches. One ventilator/escape hatch shall be located in the roof at the front of the coach, another in the roof at the rear of the coach.

M.119. CHASSIS

M.119.1. PROPULSION SYSTEM

OMES/PURCHASING
M.119.2. VEHICLE PERFORMANCE
M.119.3. POWER REQUIREMENTS

M.119.3.1. The propulsion system and drive train shall provide power to enable the coach to meet the defined acceleration, top speed, and gradability requirements. Sufficient excess power shall be available to operate all accessories without jeopardizing coach performance or safety parameters.

M.120. TOP SPEED
M.120.1. The coach shall be governed at 72 mph (116 kph) road speed, for emergency and passing maneuvers, on a straight, level road at SLW.

M.121. GRADABILITY
M.121.1. Gradability requirements shall be met on grades with a surface friction coefficient of 0.3 and above at SLW with all accessories operating. The standard configuration power plant shall enable the coach to maintain a speed of 44 mph (71 kph) on a 2-percent grade and 7 mph (11 kph) on a 16-percent grade.

M.122. ACCELERATION
M.122.1. Vehicle shall accelerate from 0 to 20 mph (0 – 32 kph) in nine seconds, with the coach at S.L.W.

M.123. OPERATING RANGE
M.123.1. The operating range of the coach run on the design operating profile shall be at least 400 miles (644 km) on a single fill-up of compressed natural gas fuel.

M.124. OPERATING PERFORMANCE
M.124.1. Speed, gradability, and acceleration performance requirements shall be met at, or corrected to, 85 degrees F (29º C), 29.00 inches (74 cm) Hg, dry air. Performance degradation at conditions other than the test standard shall not exceed 1 % for each 3 degrees F/C and 4 % for 1,000 feet (305 m) of altitude above the standard.

M.125. POWERPLANT MOUNTING AND ACCESSORIES
M.125.1. MOUNTING

M.125.1.1. The power plant shall be mounted in a compartment in the rear of the coach. All power plant mountings shall be mechanically isolated to minimize transfer of vibration to the body structure. Clamps required for securing or supporting lines shall be rubber or plastic coated and properly sized for the line being clamped.

M.126. SERVICE
M.126.1. 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. The power plant shall be mounted on a cradle which can be slid into and out of the coach. Two mechanics shall be able to remove, replace and prepare the engine and transmission assembly for service in less than 25 total combined man-hours.

M.126.2. The muffler, exhaust system, air cleaner, air compressor, starter, turbocharger, alternator, radiator, including charge air circuit, all accessories, and any other components requiring service or replacement shall be installed in or above the engine compartment.

M.126.3. The turbocharger, alternator, air compressor, and starter shall be replaceable without dismounting or removing other coach parts and without gaining access through the coach interior.

M.126.4. The cooling system filler caps shall be removable from the filler neck and be held closed with spring pressure or positive locks. The transmission filler tube shall employ a combination dipstick and cap and shall be the minimum length permissible to make fluid checking easier. All fluid fill locations shall be properly labeled to help ensure correct fluid is added and all shall be easily accessible with standard funnels, pour spouts, and automatic dispensing equipment. All lubricant sumps shall be fitted with drain plugs of a standard size except for the transmission which uses a recessed square socket type plug. The power plant shall be equipped with digital, computerized diagnostic capability using laptop or PC-based available diagnostic software for displaying engine and transmission data.

M.126.5. The engine and transmission shall be equipped with sufficient heavy-duty fluid 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. All filters shall be easily accessible and the filter bases shall be plumbed in a manner so as to assure correct reinstallation.

M.126.6. CNG fuel lines within the engine compartment shall be rigidly supported and shall be composed of stainless steel tubing where practicable. Flexible fluid lines shall be kept at a minimum and shall be as
short as required. CNG fuel lines shall be routed or shielded so that failure of a line shall not allow CNG fuel to be released, spray, or drain onto any component operable above the auto-ignition temperature of natural gas.

M.126.7. Flexible lines shall be individually supported and shall not touch one another or any part of the coach.

M.127. AIR CLEANER

M.127.1. The air cleaner shall be a dry type, horizontally mounted. Airflow through the filter element shall be from the outside in. To service the filter shall take less than 5 minutes, disconnecting an engine air intake duct, air compressor intake duct, or filter housing shall not be necessary. The access cover of the air filter assembly shall be retained to the filter housing with a single wing nut. A Filter Minder air filter restriction indicator, part number 135501-00920, manufactured by Engineered Products Co. or approved equal, shall be provided and calibrated to 20 inches (51 cm) of water/vacuum.

M.128. ACCESSORIES

M.128.1. Powertrain accessories shall be unit mounted for quick removal and repair. These accessories shall be driven at speeds sufficient to assure adequate system performance during extended periods of operation. The power steering pump and air compressor shall be flange mounted and gear driven from engine. The power steering reservoir shall be remotely mounted to the bus chassis and shall not be mounted on the drivetrain. Alternators shall be Leece Neville or approved equal. Only the 24 volt alternators, A/C compressor and cooling system fans may employ belt drives. Tension on the belt driven A/C compressor shall be maintained by an automatic tensioner. The alternator and the fan drive shall be automatically tensioned as well.

M.129. HYDRAULIC DRIVE

M.129.1. Hydraulic system service tasks shall be minimized and scheduled not more frequently than scheduled tasks for other major coach systems. All elements of the hydraulic system shall be easily accessible for service or unit replacement. All lines shall be compatible with the hydraulic fluid and maximum pressures of the system. Flexible lines shall be minimized in quantity and length. Lines of the same size and with the same fittings as those on other piping systems of the coach, but not interchangeable, shall be tagged or marked for use on the hydraulic system only. Hydraulic lines shall be individually and rigidly supported to prevent chafing damage, fatigue failures, and tension strain on the lines and fitting. Hydraulically driven radiator and charge air cooler fan drive systems are not acceptable.

M.129.2. The hydraulic system shall be configured and/or shielded so that failure of any flexible line shall not allow hydraulic fluid to spray or drain onto any component operable above fluid auto-ignition temperature.

M.130. POWERPLANT

M.130.1. ENGINE

M.130.1.1. The engine shall consist of Cummins ISX 12L 425HP, 1450ft/lb torque EPA engine with Cummins engine brake or approved equal.

M.130.1.2. The engine shall come with an engine block heater.

M.130.1.3. The engine shall come with a pro heat or equivalent engine heater.

M.131. COOLING SYSTEM

M.131.1. The cooling system shall be sized to maintain fluids at safe, continuous operating temperatures during the most severe operations possible with the coach loaded to GVWR and with ambient temperatures up to 110 degrees F (43 C). Sufficient reserve capacity shall be provided by the cooling system to provide efficient cooling for the coolant and engine charge air in a degraded condition. Radiator(s) shall be Modine, or approved equal. Radiator(s), complete with charge air cooling circuit shall be provided, mounted above the engine compartment. The charge air cooler and the radiator shall be mounted at least 60 inches (1.50 m) above the road surface. The physical size and heat rejection capacity of the radiator along with the charge air cooling capacity shall be tested and approved by the engine manufacturer for this application. The radiator system shall be easily serviced through the rear doors. The radiator and charge air cooler shall not be stacked in front of one another. Door shall include hinges which hold the doors in the open position.

M.131.2. The charge air cooler (CAC) / radiator assembly shall be primarily of durable corrosion-resistant aluminum construction. Heat exchanger fin spacing shall not exceed 14 fins per inch. Necessary hoses shall be premium, silicone rubber type that are impervious to all coach fluids. All coolant hoses shall be secured with constant tension hose clamps. Fan speed shall be regulated to minimize fan noise. No
heat producing components or climate control system components shall be mounted between the engine cooling air intake aperture and the heat exchangers. All cooling system fittings are to be cast iron, brass or copper.

M.131.3. A single fan, belt driven from the engine shall pull outside air through an exterior panel and across the radiator / charge air cooler at a minimum rate approved by the engine manufacturer for maximum cooling efficiency. Belt tension shall be maintained by an automatic belt tensioner to minimize belt slippage and ensure longer belt life. A Linig fan clutch or approved equal shall control fan operation.

M.131.4. Radiator surge tank shall be made of heavy-duty steel. A sight glass to determine satisfactory engine coolant level shall be provided and shall be accessible by opening the radiator access doors. A spring-loaded radiator cap shall also be provided on the coolant filter base which allows filter replacement without coolant loss. Quarter turn valves shall also be provided and installed in the entire cooling system which permits complete shutoff of both lines for the heating and defroster units.

M.131.5. Engine thermostats shall be easily accessible for replacement. The engine cooling system shall be equipped with a properly sized or approved equal cooling system filter with a spin-on, disposable element. The engine coolant shall be extended life Power Cool Plus using Organic Acid Technology (OAT) or approved equal. Shut-off valves shall be provided on the coolant filter base which allows filter replacement without coolant loss. Quarter turn valves shall also be provided and installed in the entire cooling system which permits complete shutoff of both lines for the heating and defroster units.

M.131.6. All low points in the water-based cooling system shall be equipped with drain cocks. Air vent lines shall be fitted at high points in the cooling system. Oil and water temperature gauges will be provided in the engine compartment.

M.132. TRANSMISSION

M.132.1. The transmission shall be an Allison B500 six speed transmission, equipped with Allison Transmission Electronic Controls (Gen. IV) or approved equal. Maximum input horsepower shall be 550 horsepower. Maximum input torque capability shall be 1650 pound feet of torque. The transmission shall have a one stage, three element, polyphase torque converter and a lock up clutch with a torsional damper. The transmission shall be fully automatic with six forward gear ratios. Shift calibration shall be set so that shifts shall be smooth under all operating conditions. The transmission shall only have one maintenance dipstick, and no other secondary service lane dipsticks. The transmission will also include a Probalyzer, or approved equal, brass Mini-gauge plug to permit transmission fluid analysis sampling.

M.132.2. If an Allison B500 Gen IV transmission is equipped it shall be filled with synthetic transmission fluids that meet Allison TES-295 specification and have a TES-295 approval number and the Allison approval logo. Mobil Delvac Synthetic Automatic Transmission Fluid can be used or Allison TES-295 approved equals such as Castrol Transynd. Allison Transmission extended warranty plans require synthetic transmission fluids meeting the TES-295 specification with an approval number and the Allison approval logo to be used.

M.132.3. Transmission shall be warranted for five years.

M.132.4. The gearing shall be of the constant mesh, helical, planetary type with the following ratios:

<table>
<thead>
<tr>
<th>RANGE</th>
<th>RATIO</th>
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<tbody>
<tr>
<td>FIRST</td>
<td>3.51:1</td>
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<tr>
<td>SECOND</td>
<td>1.91:1</td>
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<tr>
<td>THIRD</td>
<td>1.43:1</td>
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<td>FOURTH</td>
<td>1.00:1</td>
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<tr>
<td>FIFTH</td>
<td>0.74:1</td>
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<tr>
<td>SIXTH</td>
<td>0.64:1</td>
</tr>
<tr>
<td>REVERSE</td>
<td>4.80:1</td>
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M.132.5. A function of the electronic controls shall be provided to prevent premature engagement and operation of the automatic transmission reverse gear.

M.132.6. The transmission shall be governed by electronic controls, which contain a programmable read-only memory (PROM) that will provide basic transmission control functions. All cabling and electronic devices utilized by the electronic transmission control system shall be adequately shielded against interference.

M.132.7. The transmission electronic module shall be capable of communicating with the engine electronic module to maintain maximum efficiency. The control module shall be equipped with a self-diagnostic system. A
failure shall be retained by the control module for evaluation by garage personnel using an Allison DOC software and J1939 / RS232 translation device or approved equal.

**M.132.8.** Modified diagnostics shall provide timely information on transmission oil and filter change requirements and transmission rebuild timeframes.

**M.132.9.** The electronic controls shall be completely sealed from the environment. The transmission electronic control unit shall be located in a weatherproof box that is protected from environment or potential damage from under floor baggage.

**M.133. ELECTRIC STARTER**

**M.133.1.** A Mitsubishi 105P70 24 volt starter motor, or approved equal shall be provided as a basic installation. Planetary gear reduction drive technology produces greater starting torque, rotating the armature at a higher rpm. The starter will have “Soft Start” positive pinion gear meshing technology, which will engage the pinion gear into the ring-gear before the starter begins to turn. The starting system shall be inoperable whenever the master control is in the OFF position, and whenever the emergency shut-off switch is activated or the engine is running. A starter interlock shall be provided that shall prevent the starter motor from engaging the flywheel after the engine is started.

**M.134. ALTERNATOR**

**M.134.1.** A 24-volt, 270 amp, brushless, oil-cooled, self-rectifying alternator will be mounted on the engine at the curbside of the coach. The alternator will be belt-driven off an engine-mounted accessory drive pulley. An automatic tensioner will maintain the required belt tension adjustment.

**M.134.2.** Alternator output at various engine speeds will be: idle (700 rpm) - 210 amperes, fast idle (950 rpm) - 240 amperes, full speed (2,100 rpm) - 270 amperes.

**M.135. BOOST PUMP**

**M.135.1.** A MP Boost Pump, or approved equal shall be provided as the basic coolant boost pump for coach heating requirements. The pump motor shall be a magnetic drive coupled pump operating at 24 volts DC. Coolant flow rate shall be a minimum of eight (8) gallons (30 liters) per minute. The pump operates on demand according to the driver’s heat control valve.

**M.136. EMISSIONS**

**M.136.1. MOTOR VEHICLE POLLUTION REQUIREMENTS**

**M.136.2.** The manufacturer shall provide in writing that:

- **M.136.2.1.** The engine being provided complies with the Clean Air Act when operated on diesel fuel.
- **M.136.2.2.** The horsepower of the vehicle is adequate for the speed, range and terrain in which it will be required to operate, and also to meet the demands of all auxiliary power equipment.

**M.137. EXHAUST SYSTEM**

**M.137.1.** A stainless steel exhaust system shall be provided. The system shall be located at the left hand (roadside) rear corner of the coach under structure and shall be accessed through the left rear service door. Exhaust piping shall not restrict underbody clearances. The muffler tailpipe shall direct exhaust gasses downward, toward the road surface and not up through a stack in the body of the coach.

**M.137.2.** The exhaust system shall include a DPF (Diesel Particulate Filter), designed to reduce particulate emissions. The DPF accumulates soot and residual engine oil, which are the product of combustion. A telltale light shall illuminate when the DPF needs cleaning. A “Regen” (Regeneration) switch located in the right rear corner service bay, accessed through the right rear corner service door, shall activate an internal element within the DPF that burns off the trapped soot and engine oil ash.

**M.138. FINAL DRIVE**

**M.138.1. GENERAL REQUIREMENTS**

**M.138.1.1.** The two rear axles shall have a load rating sufficient for the coach loaded to GVWR. Transfer of gear noise to the coach interior shall be minimized.

**M.139. DRIVE AXLE**

**M.139.1.** The drive axle shall be a Meritor World Axle or approved equal rated at 22,500 lbs (10,206 kg). The bearing journals on each spindle shall be induction hardened for greater durability. Ring gear shall be bolted to case. The drive axle hub end wheel bearings shall be oil lubricated. Default rear axle ratio shall be 3.42:1.

**M.139.2.** The drive axle shall be equipped with disc brakes.

**OMES/PURCHASING**
M.140. TAG AXLE

M.140.1. A tag axle shall be located behind the drive axle. The tag axle will be a solid beam type with fixed steering. The tag axle shall have single tires the same size as the tires on the front and drive axles. Tag axle weight shall not exceed 14,000 pounds. With full passenger seating capacity, load on any axle shall not exceed 22,400 pounds. Combined load capacity weight on the drive and tag axles shall not exceed 36,500 pounds.

M.140.2. Vendor shall provide an option for steerable tag axle.

M.140.3. A tag axle unloading feature will allow full or partial unloading, or dumping of air from the tag axle air spring bellows. This feature enables weight to shift to the drive axle for more traction. Manual unloading valves are located inside the RH rear curbside service door.

M.140.4. The tag axle shall be equipped with disc brakes.

M.141. Mud Flaps

M.141.1. Mud Flaps should be placed between the drive axle and tag axle.

M.142. HUBS

M.142.1. The front and tag axle hubs shall feature unitized wheel ends (UWE) complete with factory pre-load bearing/hub assemblies, lubricant and seals.

M.142.2. The drive axle shall have nodular cast iron hub assemblies incorporating Pre-Set tapered roller bearings lubricated by differential oil at each axle end.

M.143. DRIVE SHAFT

M.143.1. The drive shaft shall be a minimum 3 inches (76 mm) outside diameter, heavy-duty type Meritor 1810 series or approved equal. The drive shaft shall be guarded to prevent it from striking the floor of the coach or the ground in the event of a tube or universal joint failure. U-joint end cap retaining bolts shall be retained by metal locking plates. Both half-round yoke ends shall be attached using self-locking bolts.

M.144. SUSPENSION

M.144.1. GENERAL REQUIREMENTS

M.144.1.1. The front and rear axle suspension shall be pneumatic and equipped with straight side lobe air suspension bellows. Four suspension bellows shall be provided on the drive axle and two suspension bellows on the front axle. The tag axle shall be equipped with two straight side lobe type air springs, 9.5 inch (241 mm) nominal in diameter. Pressure in the tag axle suspension shall be automatically adjusted as required by the load-sharing system. Manual air dump valves for unloading the tag axle air suspension bellows shall also be provided in the engine compartment.

M.144.1.2. The basic suspension system exclusive of bellows, height control valves, bushings and shock absorbers, shall last the life of the coach without major overhaul or replacement. Four (4) heavy-duty rubber bushed silent block sleeve type radius rods shall be provided at both the front and rear drive axles to control lateral, longitudinal, and torsional movement. Radius rod bushings shall be Cleveite or approved equal. One transverse stabilizing rod shall be provided on front axle for additional support during coach lane changing or turning of corners. The coach shall be equipped with a sway bar designed to reduce body lean and increase bushing life. Items such as bushings and air springs shall be easily and quickly replaceable. 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.

M.145. SPRINGS AND SHOCK ABSORBERS

M.145.1. TRAVEL

M.145.1.1. The suspension system shall permit a minimum wheel travel of 3.5 inches (89 mm) in jounce and 3 inches (76 mm) in rebound. 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.

M.146. KNEELING

M.146.1. A driver-actuated kneeling device shall lower the coach floor 3.0 to 6.0 inches during loading or unloading operations regardless of load to a floor height of 42 inches (1.07 m) measured at the longitudinal
centerline of the front door. The park brake shall prevent movement when the coach is kneeled. The coach shall kneel and rise at a maximum rate of 1.5 inches per second at essentially a constant rate. A flashing indicator visible to the driver shall be illuminated until the coach is raised to a height adequate for safe street travel. An audible warning device that operates with the kneeling system shall be provided. A visual indicator meeting ADA requirements shall be provided on the curbside of the coach and shall activate during the kneeling operation. This indicator shall be appropriately marked and visible to the boarding passenger.

M.147. DAMPING

M.147.1. 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. Damping shall be sufficient to control coach motion to 4 cycles or less after hitting road perturbations. Shock absorbers shall maintain their effectiveness for at least 50,000 miles (80,467 km) in normal service. The coach shall be equipped with four shock absorbers on the drive axle and two on each side of the front axle and one on each end of the tag. Shock absorbers shall be interchangeable on each axle, side to side.

M.148. LUBRICATION

M.148.1. 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 coach 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 coach serviced by standard fittings. All fittings shall be standard pipe thread.

M.149. UNDERCOATING

M.149.1. Tectyl undercoating, or approved equal, shall be applied to the underside of the body, frame, and wheel wells. Undercoating overspray on the exterior of the coach shall be removed prior to delivery. Underbody components such as air suspension bellows and height control valves, shock absorbers, lubrication fittings, air brake system valves, brake lining, muffler and exhaust system components, drive shaft, and engine and transmission sumps shall be protected from undercoating overspray.

M.150. STEERING

M.150.1. STRENGTH

M.150.1.1. Fatigue life of all steering components shall exceed 1,000,000 miles (1,609,344 km). No element of the steering system shall fail before suspension system components when one of the tires strikes a severe road hazard. Inadvertent alternations of steering as a result of striking road hazards are steering failures. The steering column shall be manufactured by TRW or approved equal and shall provide both tilt and telescope features. The steering wheel shall be a wrapped, molded polypropylene. Finger grips shall be provided on the wheel, down and away from the driver. Steering systems that utilize an intermediate shaft to connect the main axle mounted steering box to the steering column shall utilize intermediate steering shafts manufactured by Dana Corporation or approved equal.

M.150.1.2. The front axle shall be rated at 16,000 pounds (7,257 kg) and shall be equipped with disc brakes and brake chambers with a load rating sufficient for the coach loaded to GVWR. Front axle shall be a standard, drop center type. Kingpins shall be the low friction, “Easy Steer” type for longer maintenance intervals.

M.151. TURNING EFFORT

M.151.1. The steering wheel shall be not less than 18 inches (457 mm) in diameter and shall be shaped for firm grip with comfort for long periods of time and shall not be padded. The steering wheel shall be removable with a standard or universal puller. 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 (13.6 Nm) with the front wheels straight ahead to turned 10 degrees. Steering torque may increase to 70-foot-pounds (95 Nm) when the wheels are approaching the steering stops. Steering effort shall be measured with the coach at SLW, 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 coach in operation, the steering effort shall not exceed 55 pounds (25 kg) at the steering wheel rim and perceived free play in the steering system shall not materially increase as a result of power assist failure.

M.151.2. 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.

OMES/PURCHASING
M.152. BRAKES

M.152.1. SERVICE BRAKE

M.152.1.1. Service brakes shall be controlled and actuated by an air system. Force to activate the brake pedal control shall be an essentially linear function of the coach deceleration rate. The angle of the pedal shall be ergonomically designed to minimize fatigue. At least 6.0 inches (152 mm) of slack in the airlines shall be available to allow for change out of the brake treadle valve and pedal assembly. The brake pedal shall be slightly higher than the accelerator. Provisions at the front shall be made to activate the brakes from the towing vehicle. Release of the emergency/parking brake shall require one full application of the service brake once the emergency/parking brake release valve is depressed.

M.153. FRICTION MATERIAL

M.153.1. Brake pads shall be non-asbestos, and must be designed and approved for use on the vehicle being proposed. Brake pads must provide optimum performance with the brake system being used and shall minimize brake noise under all weather conditions.

M.154. ANTILOCK BRAKE SYSTEM

M.154.1. The coach shall be equipped with a Meritor Wabco or approved equal antilock brake system or approved equal electronic controller assembly that will provide full vehicle wheel control braking for the coach. The system shall utilize an antilock brake system with disc brakes. The design of the digital electronics shall provide a high degree of protection from radio and electromagnetic interference.

M.154.2. The antilock brake system shall provide individual wheel control by using a wheel speed sensor and modulator at the front axle, drive axle and tag axle. The drive axle brakes shall be controlled completely independent of each other and therefore brake application pressure at an individual wheel shall be adjusted solely on the basis of its behavior on the road surface on which it is traveling. Wheel speed sensors shall be provided on the drive axle and will simultaneously control the wheels on the tag axle. A single modulator shall be provided that controls both rear curbside wheels and another modulator shall control the rear roadside wheels.

M.154.3. Inputs to the electronic control unit (ECU) equal shall be generated from a tone ring (exciter) by wheel sensors, which generate a signal, which varies in voltage and frequency as the speed of the wheel increases or decreases. The wheel sensor shall provide wheel speed information at the rate of 100 pulses per wheel revolution. The unit shall simultaneously receive, and individually interpret speed signals from four wheel sensors.

M.154.4. Outputs from the unit shall be provided to Meritor Wabco or approved equal brake modulator. The modulator shall be capable of receiving signals from the ECU and shall be designed to modify operator applied air pressure to the service brakes. The modulator shall be located near the service actuator(s) it controls and shall be the last air valve through which air passes on its way to the brake actuator. A wiring harness shall connect each modulator to the ECU. Solenoid valves contained in the modulator shall provide the electrical interface between the controller electronics and the air brake system. The ECU shall be capable of simultaneously and independently controlling four individual modulator assemblies.

M.154.5. The antilock brake system logic shall be designed to respond to component equipment failure using a conservative fail safe philosophy. Any single electrical failure of a component devoted to antilock braking shall result in simultaneous illumination of the antilock condition lamp on the dash, a disabling of all or part of the antilock system, and reversion to standard braking on wheels no longer under the control of antilock. The ECU is divided into two separate parts, each equally controlling a pair of diagonal brakes. When a failure or damage occurs to one half of the ECU, ABS braking function shall be maintained in the wheels that are controlled by the working part of the ECU.

M.154.6. The wires that carry information and power into and out of the controller shall be terminated with a weatherproof connector with the wiring sealed to the connector with the exception of the ECU connectors. The wire gauge used shall be sized specifically for the task which it is designed to perform. A dashboard mounted antilock condition lamp shall be provided which shall be controlled by the ECU via the multiplex system and shall serve as a means of providing the operator with the operating condition of the antilock brake system. All electrical connections on the antilock system shall be Meritor molded connectors, or approved equal. The ECU shall utilize 4 amp “JUNIOR-POWER-TIMER” series connectors, or approved equal.

M.154.7. The Data Link function shall be provided which enables the ECU to report its operating condition to an external source. The controller data link configuration shall conform to SAE standard J1708 and the coded language used shall conform to SAE J1587. Two connections in the controller shall be provided.

M.155. ELECTRONIC STABILITY CONTROL (ESC)
M.155.1. ESC (Electronic Stability Control) shall be integrated with the ABS braking system to provide improved vehicle stability. Sensors within the brake system monitor coach sideways movement and rotation, steering angle and brake application pressure to maintain coach directional stability.

M.155.2. The Electronic Control Unit (ECU) containing directional sensors shall be located in baggage compartment #3. A steering angle sensor shall be located in the steering column. These systems feed information that interacts with the ABS system providing directional and braking control.

M.155.3. The ESC/ATC telltale shall be located in the driver’s instrumentation and control center in the right hand telltale cluster. This telltale, along with the ABS telltale, monitors Electronic Stability Control (ESC) and Automatic Traction control (ATC) functions.

M.155.4. Automatic Traction Control (ATC) shall be integrated with the ESC (Electronic Stability Control) to improve traction on slippery surfaces by reducing drive wheel over-spin. ATC shall automatically switch ON and OFF as required by road conditions. If drive wheels spin during acceleration, the ATC telltale will come on, indicating ATC is active. It will go out when the drive wheels stop spinning and traction control is regained.

M.156. ATC MUD/SNOW FEATURE

M.156.1. ATC shall include a deep snow and mud feature. This function increases available traction on extra soft surfaces like snow, mud, or gravel by slightly increasing the permissible wheel spin.

M.156.2. The deep snow and mud feature is not automatic. A switch shall turn this function ON and OFF. While this feature is selected, the ESC/ATC telltale blinks continuously. Once the feature is no longer required, the switch shall turn the deep snow and mud feature off and the telltale will extinguish.

M.157. AIR SYSTEM

M.157.1. The coach air system shall operate all accessories and the braking system with reserve capacity. The engine drive Wabco SS636 37.4 cfm air compressor, or approved equal shall be sized to charge the air system brake reservoir from 0 psi. to the governor cutoff pressure of 125 psi ± 2 psi (862 kPa ± 14 kPa) in less than 3 minutes while not exceeding the engines rated speed. The air compressor shall be set to cut in at 105 psi (724 kPa).

M.157.2. Regardless of the systems air pressure, idle up to the rated engine speed shall be available to the driver with the transmission in neutral and the parking brake applied.

M.157.3. With the air system fully charged and the engine shut off, the reservoir capacity shall be sufficient to permit four full brake applications to maintain 60 psig (414 kPa). The pressure relief valve shall be mounted in the compressor cylinder head. The muffler or ping tank shall be mounted in the engine compartment relative to the air compressor discharge port. A drain mounted on the muffler or ping tank shall be directed or piped so as to discharge below the engine cradle or bulkhead level.

M.157.4. Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J844-Type 1 or ASTM B-75 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844-Type 3B for nylon tubing or ASTM D-1248, Type 1, Class C Grade E5 for polyethylene tubing if not subject to temperatures over 200°F. Accessory and other noncritical lines may use Type 3A tubing. Nylon tubing shall be installed in accordance with the following color coding standards:

M.157.5.1. HOSE COLOR AIR SYSTEM INSTALLATION

M.157.5.1.1. Green Indicates primary brakes and supply
M.157.5.1.2. Red Indicates secondary brakes
M.157.5.1.3. Brown Indicates parking brake
M.157.5.1.4. Yellow Indicates compressor governor signal
M.157.5.1.5. Black Indicates accessories
M.157.5.1.6. Blue Indicates suspension

M.157.6. Line supports shall prevent movement, flexing, tension strain, and vibration. Copper lines shall be supported by looms, grommets, or insulated clamps to prevent the lines from touching one another or any component of the coach. 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 consistent with standard automotive practice. Nylon lines may be grouped and shall be continuously supported.
M.157.7. The compressor discharge line between power plant and body mounted equipment shall be flexible extruded PTFE tube with stainless steel wire braid, Aeroquip 2807, or approved equal. Other lines necessary to maintain system reliability shall be flexible hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, reusable, 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 coach except for the supporting grommets. Flexible lines shall be supported at 2 foot intervals or less. Airlines shall be installed to minimize air leaks. Each coach shall not leak down more than 1.5 psi as indicated on the instrument panel mounted air gauges, within 15 minutes from the point of governor cut-off.

M.157.8. All reservoir supply and delivery airlines shall be sloped toward reservoirs and routed to prevent water traps. Grommets shall protect the airlines at all points where they pass through understructure components. Provision shall be made to apply shop air to a convenient location in the engine compartment and at the front of the coach and shall include a standard bore valve. The engine compartment valve shall be located ahead of a quarter turn valve. Air for the compressor shall be filtered through the main engine air cleaner system. All air reservoirs shall meet the requirements of SAE Standard J10 and shall be equipped with clean-out plugs and quarter-turn drain valves. These valves shall be protected from road hazards by major structural members. The air system shall be protected by a pressure relief valve set at 200 psi (1,379 kPa) at the air dryer and 150 psi (1,034 kPa) at the compressor. The air system shall also be equipped with check valves and pressure protection valves to assure partial operation in case of line failures.

M.157.9. The main airline check valve located between the air compressor and the first reservoir must be accessible for maintenance. Means shall be provided to establish the check valve to be in working order. A Wabco SS1200 Plus or approved equal air dryer shall be provided and installed according to component manufacturer recommendations.

M.158. GENERAL CHASSIS

M.158.1. WHEELS AND TIRES

M.158.2. WHEELS

M.158.2.1. Hub-piloted 9 aluminum Alcoa or approved equal wheels shall be provided. 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. One spare wheel, complete with mounted tire shall be provided. Hub covers shall be chrome.

M.158.2.2. The wheel nuts shall meet all physical property requirements defined in ASTM A 194-2H, ISO and SAE standards. The nut shall be coated for corrosion resistance. The bench testing requirements for the lug nuts shall satisfy MIL-STD 1312 vibration test 7 and the Junkers dynamic test. Front and tag axle lugnuts shall be standard Meritor or approved equal components.

M.159. TIRES

M.159.1. The tires shall be supplied by the vehicle manufacturer. Tires, including spare, shall be Firestone FS-400, 315/80R-22.5, 20 ply, load range L or approved equal. Tires shall be suitable for the conditions of commuter service and sustained operation at the maximum speed capability of the coach. Load on any tire at GVWR shall not exceed tire supplier's rating. Tires shall provide the ride, noise, and handling characteristics associated with the demands of commuter service.

M.160. BUMPERST

M.160.1. LOCATION

M.160.1.1. Bumpers shall provide impact protection for the front and rear of the coach up to 26 inches above the ground. The bumpers shall wrap around the coach to the extent practicable without exceeding allowable coach width.

M.161. FRONT AND REAR BUMPERS

M.161.1. The front bumper assembly, nominally 20 inches (508 mm) high, shall consist of three energy absorbing modules that are self-restoring black urethane with minimum 1700 psi (11,721 kPa) tensile strength, 250 % elongation, and 350 psi (2,413 kPa) tear strength. The hollow ribbed black urethane cover will have excellent resistance to tears, abrasion, salt, hydro-carbons, detergents, sunlight, and will be repairable. An inner support structure constructed of aluminum or high strength steel shall provide a single, full length structural support for bumper the modules. The bumper assembly shall be hinged at the bottom for access to the spare tire, with the bumper release lever located at the top of the front roadside service compartment.
M.161.2. The rear bumper will be aluminum nominally 11 inches high (279 mm) and aluminum inner support structure with a repairable hollow ribbed black urethane cover. The bumper shall be shaped to wrap around the coach rear corners to protect the engine compartment doors and will also incorporate an anti-ride, or pinning feature to prevent unauthorized riders.

M.161.3. The complete assembly will be self-contained, self-restoring and maintenance-free.

M.162. ELECTRICAL SYSTEM

M.162.1. GENERAL REQUIREMENTS

M.162.1.1. The basic coach electrical system shall utilize multiplexed Power Management Modules (PMMs) from Actia, or approved equal. Versatility and future expansion of the system shall be provided for by expandable system architecture. The system shall be SAE J1939 compatible. A gateway used to interface between different communications protocols shall be built directly into the PMMs.

M.162.1.2. The system components shall be capable of reliable operation in an environment of between minus 30C to plus 80C while encountering mobile shock and vibration. Each module shall be adequately shielded to prevent interference by EMI. The multiplex power source shall be isolated, thereby minimizing any ground signal noise. A built in self-test system shall be utilized to check for module communication failures or output feedback problems within the system, and shall display faults on the LCD Diagnostic Interface.

M.162.1.3. The components of the multiplex system shall be of modular design thereby providing for ease of replacement by field maintenance personnel. Power management modules will have the ability to be re-programmed from existing PMMs on the coach. Four PMMs shall be distributed throughout the coach (one under the front junction box, one in baggage bay #1, and two in baggage bay #3). Each module shall have 29 programmable inputs and 44 programmable outputs.

M.162.1.4. An optional 7” diagonal color LCD touch screen with 800 x 480 screen resolution shall be incorporated to provide system status and diagnostics.

M.162.1.5. Two Leece Neville 24 volt 140 amp alternators, or approved equal shall be provided. All circuits shall be protected by circuit breakers, fuses or solid state devices. Only the bus body and framing shall be used to attach ground studs. Grounds shall not be carried through hinges, bolted joints (except those specifically designed as electrical connectors), or power plant mountings. Wiring and electrical equipment necessarily located under the coach shall be insulated from water, heat, corrosion, and mechanical damage.

M.162.1.6. Twenty two 110 volt duplex outlets with a total minimum power of 3600 watts shall be provided.

M.163. MODULAR DESIGN

M.163.1. 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 30 minutes by a mechanic. Power plant wiring shall be an independent wiring module. Replacement of the engine compartment wiring module(s) shall not require pulling wires through any bulkhead or removing any terminals from the wires.

M.164. JUNCTION BOXES

M.164.1. All relays, controllers, and other electrical components shall be 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. A rear start and run control box shall be mounted in an accessible location in the engine compartment. No electrical controls shall be located where spillover from the surge tank can wash over the electrical controls or enter junction boxes.

M.164.2. Care shall be taken to route electrical harnesses from junction boxes to facilitate troubleshooting and to reduce defects. Terminal strips not blocks shall be used to make connections. Wiring under the coach floor in the baggage area shall be routed in an enclosed trough.

M.165. WIRING AND TERMINALS

M.165.1. All wiring between major electrical components and terminations, except battery wiring, shall be waterproof, and shall meet specification requirements of SAE Recommended Practice J555 and J1128 Type GXL or TXL. All wiring harnesses manufactured for buses purchased under this contract shall be
designed and manufactured for the operation of all sub components installed on the buses. Harnesses shall be properly designed and sized to the bus. Battery wiring shall conform to specification requirements of SAE Standard J1127-Type SGX, SGT or SGR and SAE Recommended Practice J541.

M.165.2. All wiring shall be properly grouped, numbered, and color-coded full length. Numbering shall be stamped at least every two (2.0) inches (50.8 mm). Installation shall permit ease of replacement. All wiring harnesses over 5-feet (1.50 meters) long and containing at least five (5) wires shall include at least 2 or 10 percent excess wires whichever is greater for spares, excluding the battery cables. In addition, twelve (12) spare wires (excluding battery cables) shall be provided between the front and rear junction boxes. 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.

M.165.3. Wire insulation shall be maintained as close to the terminals as practicable. The requirements for double insulation shall be met by wrapping harnesses with plastic electrical tape or by sheathing all wires and harnesses with nonconductive, rigid or flexible conduit. Grommets of elastomeric materials shall be provided at points where wiring penetrates the metal structure. Wiring supports shall be nonconductive. Precautions shall be taken to avoid damage from heat, water, solvents, or chafing. Wiring length shall allow replacement of end terminals twice without pulling, stretching, or replacing the wire.

M.165.4. Except for those on large wires such as battery cables, terminals shall be crimped to the wiring. Terminals shall be full ring type or interlocking and corrosion-resistant. T-splices may be used when it is less than 25,000 circular mills of copper in cross-section: 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.

M.166. ELECTRICAL COMPONENTS

M.166.1. GENERAL REQUIREMENTS

M.166.1.1. All electrical components, including switches, relays, and circuit breakers, shall be heavy-duty designs. To the extent practicable, these components shall be designed to last the service life of the coach and shall be replaceable in less than twenty five (25) minutes by a mechanic. Sockets of plug-in components shall be polarized where required for proper function and the components shall be positively retained. Any manual reset circuit breakers critical to the operation of the coach shall be mounted in a location best suited to the application with visible indication of open circuits. The electric motor shall be heavy-duty either wound field type or permanent magnet, as listed below. Electric motors shall be located for easy replacement and except for the cranking motor the brushes shall be replaceable in less than fifteen (15) minutes without removing the motor. Provision shall be made to ensure that the lubrication line for alternator bearing is secured to prevent lubricant leaks.

M.166.1.2. SYSTEM MOTOR TYPE Main Evaporator......... Brushless DC
M.166.1.3. Condenser Motors......... Brushless DC
M.166.1.4. Driver’s Heater and Defroster....... Permanent Magnet
M.166.1.5. Windshield Wiper Motor....... Permanent Magnet
M.166.1.6. Windshield Washer Motor....... Permanent Magnet

M.166.2. Dual electric horns shall be provided. Horns shall be positioned to be protected from road hazards and the elements. The horn trumpets shall be down turned to assure drainage of any moisture that may have entered.

M.167. BATTERIES

M.167.1. Batteries shall be easily accessible for inspection and serviceable only from outside the coach. Batteries shall be of premium construction and shall be fitted with threaded stud terminals. Batteries shall be 8D with 1350 cold cranking amp capacity with 450 CCA reserve minimum. Positive and negative terminals shall have different size studs, and the battery terminals and cables shall be arranged to prevent incorrect installation. Battery terminals shall be located for access in less than thirty (30) seconds with jumper cables. No less than two conventional lead-acid batteries conforming to SAE Standard J537-Type 20T8 shall be provided. Battery cables shall be flexible and sufficiently long to reach the batteries in extended positions without stretching or pulling on any connection and shall not lie on top of the batteries. Battery cables are black with red heat shrink on the end for 24V (+), blue heat shrink for 12V (+) and white heat shrink for ground (-). A slave connection to the batteries shall provide a direct connection to the batteries for jump starting.

M.168. MASTER BATTERY SWITCHES

OMES/PURCHASING
M.168.1. A master battery switch shall be provided near the batteries to provide complete, simultaneous disconnecting of the batteries from all bus 12 & 24 volt electrical systems. The master switch shall be a "rotary" style switch. The master switch shall be located behind a dedicated access door and shall be accessible in less than ten (10) seconds for operation. The master switch shall be capable of carrying and interrupting the total circuit load. Opening the master switch with the engine operating shall not damage any component of the electrical system.

M.169. RADIO NOISE SUPPRESSION

M.169.1. 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 coach. Suppression shall be in accordance with SAE Practice J1708 and FCC standards.

M.170. INTERIOR CLIMATE CONTROL

M.170.1. CAPACITY AND PERFORMANCE

M.170.1.1. The climate control system shall be highly reliable since most failures are Class 2. Manually controlled shut-off valves shall be installed in the refrigerant lines before and after the filter dryer to allow isolation of the dryer for service. Manually controlled shut-off valves in the refrigerant lines shall allow isolation of the receiver and compressor for service. Self-sealing couplings or manual shut-off valves shall be used to break and seal the refrigerant lines during removal of major components such as the refrigerant compressor or condenser. Condenser and evaporator fans shall have a protective guard to prevent contact between mechanics and rotating fan blades. The appropriate safety warning labels shall be permanently affixed at this location.

M.170.1.2. Interior climate control system shall be provided and operate on refrigerant 134a. It shall maintain the interior of the coach at a level suitable for climate conditions found in the continental United States. The heating, ventilating, and cooling systems shall maintain an average passenger compartment temperature between 60°F (16°C) and 80°F (27°C) with a relative humidity of 50 percent or less. The system shall maintain these conditions in a ambient temperature range of 10°F to 100°F (12°C to 38°C), with a ambient humidity range of 5 to 100 percent while the coach is running. In ambient temperatures of 95°F to 115°F (35°C to 46°C) with relative humidity greater than 50 percent, the system shall maintain a temperature gradient of 20°F (7°C) while the coach is running. In ambient temperatures of 10°F to -10°F (12°C to -23°C), the average interior temperature shall not fall below 55°F (13°C) when he coach is running with no passengers.

M.170.1.3. The air conditioning (AC) compressor shall be a four cylinder, short stroke – 1.65 inch, 2.76 inch bore, 39.4 cubic inch (.65 liter) displacement with a 500 – 3500 RPM range MCI 003 (Bitzer 4NFC), or approved equal. The compressor head and body shall be of rust proof aluminum construction, providing a light weight, compact and efficient unit. The connecting rods shall be of one piece construction for easy, long-life maintenance. Exchangeable cylinder liners shall be used in the cylinder bores for long service life and easy and efficient maintenance. The compressor shall be belt driven through a bi-directional & maintenance free magnetic clutch. Modern, environmentally friendly chlorine free refrigerants can be used with the compressor.

M.170.1.4. Compressor drive belts shall be manufactured from Kevlar® material to provide longer service life.

M.170.1.5. A manually adjustable belt tensioning device shall be provided to maintain proper belt tension.

M.170.1.6. The main air conditioning system capacity shall be at least 90,000 Btu's/hr. (26,376 W) with R134a.

M.170.1.7. Driver's A/C capacity shall be at least 10,800 Btu's/hr. (3,165 W).

M.170.1.8. The condenser fan motors with shrouded axial fans shall be brushless type with totally enclosed grease lubricated bearings. Motor shall be 24 volt, minimum 2 horsepower (1.5 kw) and operate only when the A/C is on for maximum efficiency. The condenser core shall be located to the rear of the number 2 baggage bay and include copper tubes and e-coated aluminum fins and have approximately 1,200 in² (7,742 cm²) of condensing surface. The receiver tank shall be equipped with a refrigerant sight gauge to be viewed through a window in the left-hand number 3 baggage compartment.

M.170.1.9. The evaporator shall be mounted under floor in the same compartment as the heater core for "Reheat Cycle" and humidity control and shall include copper tubes and aluminum fins.

M.170.1.10. A separate control shall be provided for the front dash heating and air conditioning, as well as for the main under floor unit. A HVAC system control panel is required for the
main under floor system. Control shall be within easy reach of the operator. The system shall allow the driver to set a specific interior coach temperature between the range of 60° F (16°C) and 80° F (27°C). The outside temperature can be displayed by switching between interior and exterior on the control panel. The HVAC controller shall monitor the temperature so that the interior temperature selected is maintained consistently. Where practicable, all controls shall be of a solid state design.

M.170.1.11. The system shall be designed with return air ducts at both front and rear of coach for balanced airflow. The system shall introduce a minimum of 10% fresh outside air when the fresh air intake is open.

M.170.1.12. Heat shall be applied to the front step tread to prevent accumulation of snow, ice, or slush. Step well heat shall be supplied and controlled by the driver's heater and defroster system. The manufacturer shall provide and install two valves with caps near the air conditioning compressor.

M.170.1.13. All electric motors which are part of the climate control system shall be permanent magnet type, except the Condenser and Main Evaporator motors, which shall be brushless type. Motors shall have double sealed, pre-lubricated anti-friction, replaceable ball bearings with moisture resistant grease. 3/8 inch (10 mm) and 5/16 inch (8 mm) diameter zinc terminal studs with bonded internal motor leads and anti-rotation insulators shall be used except driver's evaporator and parcel rack evaporators.

M.171. CONTROLS

M.171.1. The heating, cooling, ventilating and off operational modes of the interior climate control system shall be controlled by switches or displays conveniently located to the driver. In the heating and cooling modes, the system shall be governed by an electronic control that regulates the amount of cooling and heating capacity available to the passenger area. The temperature will be adjustable between 60° F (16°C) and 80° F (27°C). The temperature sensors used must be suitable for transit service and accurate to +/- 1°F.

M.172. AIR FLOW

M.172.1. PASSENGER AREA

M.172.1.1. The cooling mode of the interior climate control system shall introduce air into the coach up along the sidewall at a minimum rate of 25 cubic feet (0.71³ m) per minute per passenger based on the standard configuration coach with full standee load. This air shall be composed of no less than 10 percent outside air. Airflow shall be evenly distributed throughout the coach with air velocity not exceeding 60 feet (0.305 meters) per minute on any passenger.

M.172.1.2. Airflow may be reduced to 15 cubic feet (0.43³ m) per minute per passenger when operating in the heating mode with full standee load. Heated air introduced into the coach shall contain no less than 10 percent outside air. In the heating mode, the fans will activate immediately to assure an air outlet temperature of 70 degrees F (21º C). Outside airflow may be cut off during initial warm up/cool down, provided that manual adjustment is not required.

M.173. DRIVER'S AREA

M.173.1. The coach interior climate control system shall deliver at least 200 cubic feet (6.0³ m) per minute of air to the driver's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shut down of the airflow. A separate heater or windshield defroster unit shall be capable of diverting heated air to the driver's feet and legs. The defroster motor shall be a permanent magnet type motor. The defroster or interior climate control system shall maintain visibility through the driver's side window. A separate evaporator, fan and control shall supply conditioned air to the driver's area.

M.174. AIR INTAKE

M.174.1. Outside openings for air intake shall be located to ensure cleanliness of air entering the climate control system, particularly with respect to exhaust emissions from the coach and adjacent traffic. All intake openings shall be baffled to prevent entry of snow, sleet, or water. Outside air shall be filtered before discharge into the passenger compartment. More efficient air filtration may be provided to maintain efficient heater and/or evaporator operation. The air filter shall be easily removed for service. Moisture drains from air intake openings shall be located so that they will not be subjected to clogging from road dirt, but shall be accessible for cleaning and inspection.

M.175. RADIO AND PUBLIC ADDRESS

M.175.1. MOBILE RADIO SYSTEM
M.175. A radio compartment, antenna, conduit, electrical and other requirements shall be provided to support a mobile radio system as and if required by the end user. The location, materials, and installation of all items installed on the coach in support of the mobile radio equipment is subject to approval by the end user. Any special tools required such as, but not limited to, security screwdrivers and latch handles shall be supplied.

M.176. PUBLIC ADDRESS SYSTEM

M.176.1. A public address system shall be installed that enables the driver to address passengers either inside or outside the coach. A total of at least 20 interior speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. Speaker shall be provided outside above the entrance door so that announcements can be clearly heard by passengers standing near the door(s). A driver controlled switch shall select inside or outside announcements. The system shall be muted when not in use. The microphone shall not interfere with the operation of the mobile radio system.

M.177. ENTERTAINMENT SYSTEM

M.177.1. An in vehicle passenger entertainment system shall consist of 1 AM/FM/CD/DVD/Radio in dash within reach of the vehicle operator. A minimum of six 10” or greater LCD monitors shall be placed strategically for maximum passenger viewing.

M.178. EMERGENCY EQUIPMENT

M.178.1. On board emergency equipment, per Federal Motor Carrier Safety Regulations Part 393, shall be provided with each coach. The equipment shall be mounted out of the way of passengers but shall be readily accessible:

M.178.1.1. Fire Extinguisher - 5 pound (2.3 kg) capacity, Underwriter's Laboratories rating of A, B, C or more, marked as such with charge indicator, mounted in a cradled bracket.

M.178.1.2. Emergency Warning Triangles - Three bi-directional emergency reflective triangles conforming to the FMVSS 125 in a case and mounted in the battery compartment.

M.179. WARRANTY REQUIREMENTS

M.179.1. The contractor warrants and guarantees to the original Procuring Agency each complete bus and specific subsystem and components for 100% parts and labor as follows:

M.179.1.1. Warranty shall begin on the date that the vehicle delivery is accepted by the agency issuing the purchase order.

M.179.1.2. The air-conditioning system shall have a minimum 2 years unlimited mileage.

M.179.1.3. Any parts under warranty must be available and delivered to the purchasing transportation provider or their repair shop within 5 days of the time they requested/ordered them. The bus vendor/manufacture shall bear all reasonable financial costs of shipment of parts.

M.179.1.4. The warranty, as well as any recall notifications, shall cover each vehicle of the ultimate purchaser or recipient agency. The vendor shall provide a copy of any recall notice to the purchasing agency.

M.179.1.5. Bumper to bumper twenty four month warranty with unlimited mileage.

M.180. BUS TESTING

M.180.1. Certification shall be provided that in accordance with 49 CFR Part 665,

M.180.2. Bus Testing, the vehicle either does not need to be tested (with justification specified for exemption) or has been tested at the bus testing facility and a test report is included.

M.181. BUS WATER TESTING

M.181.1. The roofs, windows, windshield and all doors of all coaches shall be water tested, as follows:

M.181.2. The water test shall consist of a series of nozzles that are strategically located around the perimeter of the vehicle so as to the nozzles spray water over the entire surface of the vehicle.

M.181.3. The nozzles shall eject a volume of water no less than 2.6 gallons per minute under a pressure of no less than twenty-two (22) pounds per square inch measured at the nozzle tip.

M.181.4. There shall be no less than twenty (20) nozzles installed in the water test area, each capable of directing a force of water as indicated above.
M.181.5. The Vendor/Manufacture shall be required to water test each vehicle, under the conditions set forth above, for no less than five (5) minutes, in order to determine whether or not there are any body leaks at the window areas, door areas, roof panels, etc.

M.181.6. The Vendor/Manufacture shall take the necessary corrective action when body leaks are found to exist as a result of the above test, and conduct a second water test to recheck for body leaks following corrective action.

M.182. ALTOONA TESTING

M.182.1. Vehicle must be tested in the 7-year/200,000 mile category at the Altoona Bus Testing Facility in Duncansville, PA. And a copy of the full report must be submitted with the Proposal.

M.183. GENERAL

M.183.1. All equipment cataloged as standard for the basic vehicle, unless superseded by these specifications, must be furnished and included in the purchase price of each vehicle. Complete printed specifications, published literature, and photos, or illustrations of the basic units that the Supplier proposes to furnish with this Proposal must accompany each Proposal.

M.184. QUALITY OF MATERIALS

M.184.1. Welding procedures and materials shall be in accordance with standards of the American Society of Testing Materials and the American Welding Society. All visible welds shall be grounded smooth. Where metal is welded, the contact surface shall be free of scale, spatter, and grease and shall be treated to preclude rusting.

M.185. PUBLICATIONS AND PRINTED MATERIALS

M.185.1. Each vehicle shall have a complete set of operation, quality assurance, and warranty publications.

M.185.2. The information shall be organized in a three ring binder format with each sections clearly identified.

M.185.3. As built wiring diagram and as built parts manuals for body and all auxiliary equipment.

M.185.4. Maintenance and inspection schedule incorporating the required maintenance and inspection of the basic vehicle and its sub-systems.

M.185.5. Operator’s manual: A complete operations manual and troubleshooting guide with a detailed manufacturer’s parts list that covers the conversion features on the vehicle as listed in this specification. The manual will provide complete, comprehensive instructions for the wheelchair accessories, wheelchair list deployment, air conditioning system, tie downs, heater, deployment of seats, wiring diagram and related equipment. One paper copy and an electronic copy of the parts and maintenance manual will be provided by the seller to the buyer.

M.185.6. Warranty papers for chassis, body, and additional equipment.

M.185.7. Warranty Information: Each vehicle must have a published listing of contractor warranty repair locations, including address, telephone number, and contact names for the State of Oklahoma.

M.186. PRE-AWARD AUDIT

M.186.1. The vehicles are not considered delivered to the purchasing agency until the required FTA documents are completed by a Government Official.

M.186.2. A Pre-Award Audit shall be conducted to determine if the proposal meets specifications. The Supplier shall submit documents, which include certification of the manufacturer’s compliance with the Federal Transit Administration (FTA) Pre-Award Buy America Audit Requirements. The document submitted shall include the following information for each major component used on vehicle:

M.186.2.1. Name and address of each supplier.

M.186.2.2. Cost of each major component and subcomponent. In order to protect proprietary information, the document may reflect the percentage of total cost each item represents instead of the actual cost.

M.186.2.3. Country of origin of each major component and subcomponent.

M.186.2.4. Name and address of company where final assembly occurs.

M.186.2.5. Cost of final assembly

M.186.2.6. Signature of authorized representative of vehicle manufacturer.

M.187. POST-DELIVERY AUDIT
M.187.1. A Post Delivery Audit of the vehicle(s) shall be conducted at the purchaser’s facility, to determine that the completed vehicle(s) meets specifications. Once this process has been satisfactorily completed, the vehicle(s) shall be considered acceptable.

M.188. ACCESSIBILITY REQUIREMENTS

M.188.1. When submitting a Proposal for an accessible vehicle for the disabled, the vendor shall provide a list of the vehicle related equipment illustrating the component cost and related installation charges. The purpose of this list is to reflect an accurate cost for those vehicle related items, which are required to make the vehicle accessible to the disabled.

M.189. ACCEPTANCE OF VEHICLES

M.189.1. Upon delivery at the designed location specified within this document the final acceptance will occur after the vehicles have been inspected, road tested and all FTA required post audit delivery requirements have been meet.

M.189.2. All vehicles shall be insured by the Supplier until the post audit delivery has been conducted at minimum
### BASE VEHICLE COST PER UNIT

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<th>BASE VEHICLE</th>
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### LIST OPTIONAL ITEMS COST

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<th>OPTIONAL ITEMS</th>
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<td>BACK-UP MONITOR SYSTEM</td>
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<td>TWO-WAY RADIO (UHF)</td>
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<td>TWO-WAY RADIO (VHF)</td>
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<td>TWO-WAY RADIO (800 MZ)</td>
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<td>DRIVER'S SHIELD</td>
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<td>PAINTED LOWER SKIRTS</td>
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<td>OUTSIDE PASSENGER DOOR SWITCH</td>
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<td>BUS CAMERA SYSTEM</td>
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<td>STREET SIDE EXHAUST</td>
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<td>INTEGRATED CHILD SEATS</td>
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<td>VINYL SEATS (PRICE DEDUCTION)</td>
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<td>PUBLIC ADDRESS SYSTEM</td>
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<td>PASSENGER SIGNAL SYSTEM PULL CORD</td>
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<td>PASSENGER STOP REQUEST SIGNS</td>
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<td>FARE COLLECTION BOX</td>
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<td>DESTINATION SIGNS</td>
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<td>BICYCLE RACKS</td>
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<td>DELETE ALTRO CHROMA FLOORING (PRICE DEDUCTION)</td>
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<td>DELETE YELLOW POWDER COATING ON HANDRAILS, GRAB RAILS, AND STANCHIONS (PRICE DEDUCTION)</td>
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<td>COMPOSITE FLOOR</td>
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<td>SIDE DOOR SLIDE OUT BATTERY BOX</td>
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<td>DIESEL ENGINE</td>
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<td>REAR SPARE TIRE HOLDER</td>
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<td>ADJUSTABLE REAR SUSPENSION SYSTEM</td>
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<td>MEMO/PAMPHLET RACK (See Figure 6)</td>
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<td>FREEDMAN SEATING TDSS (OR EQUIVALENT) FOLD AWAY SEAT (See Figure 7)</td>
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<td>METAL BOX (See Figure 8)</td>
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A LIST OF OPTIONAL EQUIPMENT AND/OR ACCESSORIES SHALL BE PROVIDED. THE LIST MUST CONTAIN:

- Item
- Description and functionality detail
- Cost of item installed in final delivery of vehicle
- Any changes to listed specifications as outlined above to accommodate options

PROPOSAL EXCEPTIONS

Supplier must list any exceptions here to be used as a part of the Proposal evaluation and analysis. Please list the roman numerical on the standard specs or the number for the options when listing any Proposal exceptions.
OFFICE OF MOBILITY AND PUBLIC TRANSIT

FTA’S SPECIAL PROVISIONS
FOR THE PROCUREMENT OF CAPITAL EQUIPMENT
WITH AN ESTIMATED CUMULATIVE COST
IN EXCESS OF $100,000

STATEMENT OF FEDERAL PARTICIPATION

THIS PROCUREMENT IS DEPENDENT UPON THE AVAILABILITY OF FEDERAL FUNDS THROUGH THE FEDERAL TRANSIT ADMINISTRATION (FTA)

PAGES 2 THRU 15 OF THIS DOCUMENT ARE TO BE COMPLETED BY BIDDER/VENDOR

PAGES 18 THRU 24 OF THIS DOCUMENT ARE TO BE COMPLETED BY ODOT AT TIME OF THE BID AWARD

PAGES 26 THRU 32 ARE TO BE COMPLETED BY THE PURCHASER AT THE TIME OF VEHICLE DELIVERY
SPECIAL PROVISIONS FOR THE PROCUREMENT OF CAPITAL EQUIPMENT USING FEDERAL FUNDS

THE FOLLOWING REQUIREMENTS AND CONDITIONS ARE INCLUDED AS AN ESSENTIAL PART OF THE SPECIFICATIONS ATTACHED HERETO.

SECTION I. FOR ALL BIDS:

FMVSS CERTIFICATION - 49 CFR 571 Part D
(Circle all applicable standard #s)

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<td>*Controls and Displays</td>
<td>102</td>
<td>*Transmission shift lever sequence, starter, interlock, transmission braking effect</td>
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<td>103</td>
<td>*Windshield defrost and defogging system</td>
<td>104</td>
<td>*Windshield wiping and washing system.</td>
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<td>105</td>
<td>*Hydraulic brake system.</td>
<td>106</td>
<td>*Brake hoses</td>
</tr>
<tr>
<td>107</td>
<td>*Reflecting surfaces</td>
<td>108</td>
<td>*Lamps, reflective devices, and assoc. equip.</td>
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<tr>
<td>109</td>
<td>*New pneumatic tires</td>
<td>110</td>
<td>*Tire selection and rims.</td>
</tr>
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<td>111</td>
<td>*Rearview mirrors</td>
<td>112</td>
<td>*Headlamps concealment devices.</td>
</tr>
<tr>
<td>113</td>
<td>*Hood latch system</td>
<td>114</td>
<td>*Theft Protection (not for walk-in vans)</td>
</tr>
<tr>
<td>115</td>
<td>*VIN -basic requirements.</td>
<td>116</td>
<td>*Motor vehicle brake fluids.</td>
</tr>
<tr>
<td>117</td>
<td>*Re-treaded pneumatic tires (to be used on rear wheels only)</td>
<td>118</td>
<td>*Power-operated window, partition, roof panel system (GVWR &lt; 10K)</td>
</tr>
<tr>
<td>119</td>
<td>New pneumatic tires for vehicles other than passenger cars</td>
<td>120</td>
<td>*Tire selection &amp; rims for vehicles other than passenger cars</td>
</tr>
<tr>
<td>121</td>
<td>*Air brake system</td>
<td>124</td>
<td>*Accelerator control system.</td>
</tr>
<tr>
<td>129</td>
<td>*New non-pneumatic tires for passenger cars.</td>
<td>201</td>
<td>@Occupant protection in interior impact</td>
</tr>
<tr>
<td>202</td>
<td>@Head restraints</td>
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</tr>
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<td>204</td>
<td>*Steering control rearward displacement (not walk-in vans)</td>
<td>205</td>
<td>*Glazing materials</td>
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<td>206</td>
<td>*Doors, locks, and door retention components.</td>
<td>207</td>
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<td>*Occupant crash protection</td>
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</tr>
<tr>
<td>210</td>
<td>@Seat belt assembly anchorages.</td>
<td>211</td>
<td>*Wheels, nuts, wheel discs, and hub caps</td>
</tr>
<tr>
<td>212</td>
<td>@Windshield mounting</td>
<td>213</td>
<td>*Child restraint system.</td>
</tr>
<tr>
<td>214</td>
<td>@Side impact protection (not walk-in vans)</td>
<td>217</td>
<td>*Bus emergency. exits / window retention &amp; release</td>
</tr>
<tr>
<td>219</td>
<td>@Windshield zone intrusion</td>
<td>220</td>
<td>*School Bus rollover protection</td>
</tr>
<tr>
<td>301</td>
<td>@Fuel system integrity (+School Bus &gt;10K GVWR)</td>
<td>302</td>
<td>*Flammability of interior materials.</td>
</tr>
</tbody>
</table>

The undersigned BIDDER/VENDOR hereby certifies that all vehicles furnished meet the FMVSS IAW 49 CFR 571.

Name of Company
Date
Printed Name of Person Signing Form Signature

*Bus @Bus with GVWR below 10,000 lbs. #Passenger Car
In submitting this bid, the undersigned BIDDER/VENDOR as noted in Section III - Certification to Purchaser, certifies and agrees to the following clauses, assurances and certifications.

The BIDDER/VENDOR agrees to include these requirements in subcontracts financed in whole or in part by Federal Transit Administration funding. The bidder/vendor must execute all certifications below.

B.1. No Federal Government Commitment or Liability to Third Parties
   B.1.1. Except as the Federal Government expressly consents in writing, the Recipient agrees that:
   B.1.1.1. The Federal Government does not and shall not have any commitment or liability related to the Underlying Agreement, to any Third Party Participant at any tier, or to any other person or entity that is not a party (FTA or the Recipient) to the Underlying Agreement, and
   B.1.1.2. Notwithstanding that the Federal Government may have concurred in or approved any Solicitation or Third Party Agreement at any tier that may affect the Underlying Agreement, the Federal Government does not and shall not have any commitment or liability to any Third Party Participant or other entity or person that is not a party (FTA or the Recipient) to the Underlying Agreement.

B.2. False or Fraudulent Statements or Claims.
   B.2.1. Civil Fraud. The Recipient acknowledges and agrees that:
   B.2.1.2. By executing the Underlying Agreement, the Recipient certifies and affirms to the Federal Government the truthfulness and accuracy of any claim, statement, submission, certification, assurance, affirmation, or representation that the Recipient provides to the Federal Government.
   B.2.1.3. The Federal Government may impose the penalties of the Program Fraud Civil Remedies Act of 1986, as amended, and other applicable penalties if the Recipient presents, submits, or makes available any false, fictitious, or fraudulent information.
   B.2.2. Criminal Fraud. The Recipient acknowledges that 49 U.S.C. § 5323(l)(1) authorizes the Federal Government to impose the penalties under 18 U.S.C. § 1001 if the Recipient provides a false, fictitious, or fraudulent claim, statement, submission, certification assurance, or representation in connection with a federal public transportation program under 49 U.S.C. chapter 53 or any other applicable federal law.

   B.3.1. The Recipient agrees and assures that each Subrecipient, if any, will agree to:
   B.3.1.1. Provide, and require its Third Party Participants at each tier to provide, sufficient access to inspect and audit records and information related to its Award, the accompanying Underlying Agreement, and any Amendments thereto to the U.S. Secretary of Transportation or the Secretary’s duly authorized representatives, to the Comptroller General of the United States, and the Comptroller General’s duly authorized representatives, and to the Recipient and each of its Subrecipients,
   B.3.1.2. Permit those individuals listed above to inspect all work and materials related to its Award, and to audit any information related to its Award under the control of the Recipient or Third Party Participant within books, records, accounts, or other locations, and
   B.3.1.3. Otherwise comply with 49 U.S.C. § 5325(g), and federal access to records requirements as set forth in the applicable U.S. DOT Common Rules.

B.4. FEDERAL CHANGES
   B.4.1. The Recipient shall at all times comply with all applicable Federal regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement as amended or promulgated from time to time during the term of this contract.

B.5. Civil Rights Requirements
   B.5.1. The Recipient agrees that it must comply with applicable federal civil rights laws, regulations, and requirements, and follow applicable federal guidance, except as the Federal Government determines otherwise in writing. Therefore, unless a Recipient or a federal program, including the Tribal Transit Program or the Indian Tribe Recipient, is specifically exempted from a civil rights statute, FTA requires compliance with that civil rights statute, including compliance with equity in service.
   B.5.2. Nondiscrimination in Federal Public Transportation Programs. The Recipient agrees to, and assures that it and each Third Party Participant, will:
B.5.2.1. Prohibit discrimination on the basis of race, color, religion, national origin, sex (including gender identity), disability, or age.

B.5.3. Prohibit the:

B.5.3.1. Exclusion from participation in employment or a business opportunity for reasons identified in 49 U.S.C. § 5332,

B.5.3.2. Denial of program benefits in employment or a business opportunity identified in 49 U.S.C. § 5332, or

B.5.3.3. Discrimination identified in 49 U.S.C. § 5332, including discrimination in employment or a business opportunity identified in.

B.5.4. Follow:

B.5.4.1. The most recent edition of FTA Circular 4702.1, “Title VI Requirements and Guidelines for Federal Transit Administration Recipients,” to the extent consistent with applicable federal laws, regulations, requirements, and guidance, and other applicable federal guidance that may be issued, but

B.5.4.2. FTA does not require an Indian Tribe to comply with FTA program-specific guidelines for Title VI when administering its Underlying Agreement supported with federal assistance under the Tribal Transit Program.

B.5.5. Nondiscrimination – Title VI of the Civil Rights Act. The Recipient agrees to, and assures that each Third Party Participant, will:

B.5.5.1. Prohibit discrimination on the basis of race, color, or national origin,

B.5.6. Comply with:

B.5.6.1. Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000d et seq.,

B.5.6.2. U.S. DOT regulations, “Nondiscrimination in Federally-Assisted Programs of the Department of Transportation – Effectuation of Title VI of the Civil Rights Act of 1964,” 49 C.F.R. part 21, and

B.5.6.3. Federal transit law, specifically 49 U.S.C. § 5332, and

B.5.7. Follow:

B.5.7.1. The most recent edition of FTA Circular 4702.1, “Title VI Requirements and Guidelines for Federal Transit Administration Recipients,” to the extent consistent with applicable federal laws, regulations, requirements, and guidance,

B.5.7.2. U.S. DOJ, “Guidelines for the enforcement of Title VI, Civil Rights Act of 1964,” 28 C.F.R. § 50.3, and

B.5.7.3. All other applicable federal guidance that may be issued.


B.5.8.1. Federal Requirements and Guidance. The Recipient agrees to, and assures that each Third Party Participant will, prohibit, discrimination on the basis of race, color, religion, sex, sexual orientation, gender identity, or national origin, and:

B.5.8.2. Comply with Title VII of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000e et seq.,

B.5.8.3. Facilitate compliance with Executive Order No. 11246, “Equal Employment Opportunity” September 24, 1965, 42 U.S.C. § 2000e note, as amended by any later Executive Order that amends or supersedes it in part and is applicable to federal assistance programs,

B.5.8.4. Comply with federal transit law, specifically 49 U.S.C. § 5332, as provided in section 12 of this Master Agreement,

B.5.8.5. FTA Circular 4704.1 “Equal Employment Opportunity (EEO) Requirements and Guidelines for Federal Transit Administration Recipients,” and

B.5.8.6. Follow other federal guidance pertaining to EEO laws, regulations, and requirements, and prohibitions against discrimination on the basis of disability,

B.5.8.7. Specifics. The Recipient agrees to, and assures that each Third Party Participant will:

B.5.8.8. Prohibited Discrimination. Ensure that applicants for employment are employed and employees are treated during employment without discrimination on the basis of their race, color, religion, national origin, disability, age, sexual orientation, gender identity, or status as a parent, as provided in Executive Order No. 11246 and by any later Executive Order that amends or supersedes it, and as specified by U.S. Department of Labor regulations,

B.5.8.9. Affirmative Action. Take affirmative action that includes, but is not limited to:

B.5.8.9.1. Recruitment advertising, recruitment, and employment,
B.5.8.9.2. Rates of pay and other forms of compensation,
B.5.8.9.3. Selection for training, including apprenticeship, and upgrading, and
B.5.8.9.4. Transfers, demotions, layoffs, and terminations, but
B.5.8.10. Indian Tribe. Recognize that Title VII of the Civil Rights Act of 1964, as amended, exempts Indian Tribes under the definition of “Employer,” and
B.5.8.11. Equal Employment Opportunity Requirements for Construction Activities. Comply, when undertaking “construction” as recognized by the U.S. Department of Labor (U.S. DOL), with:

B.6. Incorporation of Federal Transit Administration (FTA) Terms
B.6.1. 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 the most current FTA Circular 4220, 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 Consultant shall not perform any act, fail to perform any act, or refuse to comply with any NCTD requests which would cause NCTD to be in violation of the FTA terms and conditions.

B.7. Energy Conservation
B.7.1. The Recipient agrees to, and assures that its Subrecipients, if any, will comply with the mandatory energy standards and policies of its state energy conservation plans under the Energy Policy and Conservation Act, as amended, 42 U.S.C. § 6321 et seq., and perform an energy assessment for any building constructed, reconstructed, or modified with federal assistance required under FTA regulations, “Requirements for Energy Assessments,” 49 C.F.R. part 622, subpart C.

B.8. Right of the Federal Government to Terminate
B.8.1. Justification. After providing written notice to the Recipient, the Recipient agrees that the Federal Government may suspend, suspend then terminate, or terminate all or any part of the federal assistance for the Award if:
B.8.1.1. The Recipient has failed to make reasonable progress implementing the Award, The Federal Government determines that continuing to provide federal assistance to support the Award does not adequately serve the purposes of the law authorizing the Award, or
B.8.1.2. The Recipient has violated the terms of the Underlying Agreement, especially if that violation would endanger substantial performance of the Underlying Agreement.
B.8.2. Financial Implications. In general, termination of federal assistance for the Award will not invalidate obligations properly incurred before the termination date to the extent that the obligations cannot be canceled. The Federal Government may recover the federal assistance it has provided for the Award, including the federal assistance for obligations properly incurred before the termination date if it determines that the Recipient has misused its federal assistance by failing to make adequate progress, failing to make appropriate use of the Project property, or failing to comply with the Underlying Agreement, and require the Recipient to refund the entire amount or a lesser amount, as the Federal Government may determine including obligations properly incurred before the termination date.
B.8.3. Expiration of the Period of Performance. Except for a Full Funding Grant Agreement, expiration of any period of performance established for the Award does not, by itself, constitute an expiration or termination of the Award; FTA may extend the period of performance to assure that each Formula Project or related activities and each Project or related activities funded with “no year” funds can receive FTA assistance to the extent FTA deems appropriate.

B.9. Debarment and Suspension
B.9.1. The Recipient agrees to the following:
B.9.1.1. It will comply with the following requirements of 2 C.F.R. part 180, subpart C, as adopted and supplemented by U.S. DOT regulations at 2 C.F.R. part 1200.
B.9.1.2. It will not enter into any arrangement to participate in the development or implementation of the Underlying Agreement with any Third Party Participant that is debarred or suspended except as authorized by:
B.9.1.2.1. U.S. DOT regulations, “Nonprocurement Suspension and Debarment,” 2 C.F.R. part 1200,
B.9.1.2.2. U.S. OMB regulatory guidance, “Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement),” 2 C.F.R. part 180, including any amendments thereto,

B.9.1.2.4. Other applicable federal laws, regulations, or guidance regarding participation with debarred or suspended Recipients or Third Party Participants.


B.9.1.4. It will include, and require each Third Party Participant to include, a similar provision in each lower tier covered transaction, ensuring that each lower tier Third Party Participant:

B.9.1.4.1. Complies with federal debarment and suspension requirements, and

B.9.1.4.2. Reviews the SAM at https://www.sam.gov, if necessary to comply with U.S. DOT regulations, 2 C.F.R. part 1200.

B.9.1.5. If the Recipient suspends, debars, or takes any similar action against a Third Party Participant or individual, the Recipient will provide immediate written notice to the:

B.9.1.5.1. FTA Regional Counsel for the Region in which the Recipient is located or implements the Underlying Agreement,

B.9.1.5.2. FTA Headquarters Manager that administers the Grant or Cooperative Agreement, or

B.9.1.5.3. FTA Chief Counsel.

B.10. Buy America


B.11. Disputes, Breaches, Defaults, or Other Litigation

B.11.1. FTA Interest. FTA has a vested interest in the settlement of any violation of federal law, regulation, or disagreement involving the Award, the accompanying Underlying Agreement, and any Amendments thereto, including, but not limited to, a default, breach, major dispute, or litigation, and FTA reserves the right to concur in any settlement or compromise.

B.11.2. Notification to FTA. If a current or prospective legal matter that may affect the Federal Government emerges, the Recipient must promptly notify the FTA Chief Counsel, or FTA Regional Counsel for the Region in which the Recipient is located. (1) The types of legal matters that require notification include, but are not limited to, a major dispute, breach, default, litigation, or naming the Federal Government as a party to litigation or a legal disagreement in any forum for any reason.

B.11.3. Matters that may affect the Federal Government include, but are not limited to, the Federal Government’s interests in the Award, the accompanying Underlying Agreement, and any Amendments thereto, or the Federal Government’s administration or enforcement of federal laws, regulations, and requirements.

B.11.4. If the Recipient has credible evidence that a Principal, Official, Employee, Agent, or Third Party Participant of the Recipient, or other person has submitted a false claim under the False Claims Act, 31 U.S.C. § 3729 et seq., or has committed a criminal or civil violation of law pertaining to such matters as fraud, conflict of interest, bribery, gratuity, or similar misconduct involving federal assistance, the Recipient must promptly notify the U.S. DOT Inspector General, in addition to the FTA Chief Counsel or Regional Counsel for the Region in which the Recipient is located.

B.11.5. Federal Interest in Recovery. The Federal Government retains the right to a proportionate share of any proceeds recovered from any third party, based on the percentage of the federal share for the Underlying Agreement. Notwithstanding the preceding sentence, the Recipient may return all liquidated damages it receives to its Award Budget for its Underlying Agreement rather than return the federal share of those liquidated damages to the Federal Government, provided that the Recipient receives FTA’s prior written concurrence.

B.11.6. Enforcement. The Recipient must pursue its legal rights and remedies available under any third party agreement, or any federal, state, or local law or regulation.

B.12. Lobbying Restrictions

B.12.1. The Recipient agrees that neither it nor any Third Party Participant will use federal assistance to influence any officer or employee of a federal agency, member of Congress or an employee of a member of Congress, or officer or employee of Congress on matters that involve the Underlying Agreement, including any extension or modification, according to the following:

B.12.1.1. Laws, Regulations, Requirements, and Guidance. This includes:


B.12.1.1.3. Other applicable federal laws, regulations, requirements, and guidance prohibiting the use of federal assistance for any activity concerning legislation or appropriations designed to influence the U.S. Congress or a state legislature, and

B.12.1.2. Exception. If permitted by applicable federal law, regulations, requirements, or guidance, such lobbying activities described above may be undertaken through the Recipient’s or Subrecipient’s proper official channels.

B.13. Clean Air Act

B.13.1. (42 U.S.C. §§ 7401 – 7671q.) and the Federal Water Pollution Control Act (33 U.S.C. §§ 1251 – 1387), as amended—Contracts and subgrants of amounts in excess of $150,000 must contain a provision that requires the non-Federal award to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. §§ 7401 – 7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. §§ 1251 – 1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

B.14. Clean Water

B.14.1. The Common Grant Rules specifically prohibit the use of facilities included in the EPA “List of Violating Facilities,” in the performance of any third party contract at any tier exceeding $100,000. The contractor must also comply with all applicable standards, orders, or regulations issued under Section 508 of the Clean Water Act, as amended, 33 U.S.C. Section 1368, and other applicable requirements of the Clean Water Act, as amended, 33 U.S.C. Sections 1251 through 1377.

B.15. Cargo Preference


B.16. Fly America


B.17.1. When required by Federal program legislation, all prime construction contracts in excess of $2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. §§ 3141 - 3144, and 3146 – 3148) as supplemented by Department of Labor regulations (29 C.F.R. part 5). The contracts must also contain a wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must place a copy of the current prevailing wage determination in each solicitation. The non-Federal entity must also include a provision in each contract or subcontract that requires the contractor or subrecipient to pay wages not less than once a week. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contractor must also comply with all applicable standards, orders, or regulations issued pursuant to the Davis-Bacon Act (40 U.S.C. §§ 3141 – 3144), as supplemented by Department of Labor regulations (29 C.F.R. part 5, “Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction”). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must also include a provision for compliance with the Copeland “Anti-Kickback” Act (40 U.S.C. § 3145), as supplemented by Department of Labor regulations (29 C.F.R. part 5). The contracts must also include a provision for compliance with the Copeland “Anti-Kickback” Act (40 U.S.C. § 3145), as supplemented by Department of Labor regulations (29 C.F.R. part 5, “Contracts and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States”). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

B.18. “Anti-Kickback” Prohibitions of:

B.18.1. Section 1 of the Copeland “Anti-Kickback” Act, as amended, 18 U.S.C. § 874,

B.18.2. Section 2 of the Copeland “Anti-Kickback” Act, as amended, 40 U.S.C. § 3145, and


B.19.1. Where applicable, all contracts awarded by the non-Federal entity in excess of $100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. §§ 3702 and 3704, as supplemented by Department of Labor regulations (29 C.F.R. part 5). Under 40 U.S.C. § 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The
requirements of 40 U.S.C. § 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

B.20. Disadvantaged Business Enterprises

B.20.1. The Recipient acknowledges and understands that the statutory and regulatory provisions relating to disadvantaged business enterprises (DBE) differ significantly between FTA and FRA, including Section 1101(b) of the FAST Act (23 U.S.C. § 101 note) and U.S. DOT regulations, “Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs,” 49 C.F.R. part 26, both of which apply to FTA, but not to FRA.

B.20.2. FRA is not authorized to use FTA’s DBE regulations, and consequently the Recipient agrees to comply with the statutory and regulatory DBE provisions that apply to federal assistance provided by FTA when using that federal assistance for purchases.

B.20.3. The Recipient agrees to use the “contracting with small and minority firms, women’s business enterprise” provisions of the applicable U.S. DOT Common Rules.

B.21. Prompt Payment and Return of Retainage

B.21.1. The entity utilizing this Contract declines to hold retainage from prime contractor and requires a contract clause obligating the prime contractor to make prompt and full payment of any retainage kept by a prime contractor to the subcontractor within 30 days after the subcontractor’s work is satisfactorily completed.

B.22. RECYCLED PRODUCTS

B.22.1. 42 U.S.C. 6962
B.22.2. 40 CFR Part 247
B.22.3. Executive Order 12873
B.22.4. Applicability to Contracts: The Recycled Products requirements apply to all contracts for items designated by the EPA, when the Recipient procures $10,000 or more of one (1) of these items during the fiscal year, or has procured $10,000 or more of such items in the previous fiscal year, using Federal funds.
B.22.5. Flow down Requirements: These requirements flow down to all recipient and sub-recipient tiers.

B.23. ADA ACCESS REQUIREMENTS

B.23.2. Applicability to Contracts: The Recipient shall comply with 49 USC 5301(d), stating Federal policy that the elderly and persons with disabilities have the same rights as other persons to use mass transportation services and facilities and that special efforts shall be made in planning and designing those services and facilities to implement that policy. Recipient shall also comply with all applicable requirements of Sec. 504 of the Rehabilitation Act (1973), as amended, 29 USC 794, which prohibits discrimination on the basis of handicaps, and the Americans with Disabilities Act of 1990 (ADA), as amended, 42 USC 12101 et seq., which requires that accessible facilities and services be made available to persons with disabilities, including any subsequent amendments thereto.

B.24. ALTOONA TEST CERTIFICATION: (Check one of the following):

☐ The vehicle has been Altoona tested, report number: _______________________
☐ The vehicle is exempt from testing in accordance with 49 CFR 665
☐ The vehicle is currently being tested at Altoona

B.25. Rolling Stock


FEDERAL FUNDS WILL NOT BE RELEASED UNTIL THE PURCHASING AGENCY RECEIVES A COPY OF THE ALTOONA TEST REPORT IF REQUIRED IN ACCORDANCE WITH 49 CFR 665
SECTION II

A. BUY AMERICA CERTIFICATION:

BIDDER /VENDOR to complete the Buy America Certification listed below. BIDDER /VENDOR shall certify EITHER COMPLIANCE OR NON-COMPLIANCE (not both).

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/vendor or offer or hereby certifies that it will meet the requirements of 49 U.S.C. 5323(j)(2)(C) and the regulations at 49 C.F.R. Part 661.11.

Signature________________________________________________________________
Company Name___________________________________________________________
Title ______________________________________________________________
Date ______________________

Certificate of Non-Compliance with 49 U.S.C. 5323(j)(2)(C)
The bidder/vendor or offer or hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j)(2)(C) and 49C.F.R. 661.11, 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.

Signature _________________________________________________________________
Company Name __________________________________________________________
Title _____________________________________________________________
Date _______________

Instructions:

Special Note: Make sure you have signed only one of the above statements -- either Compliance OR Non-Compliance (not both).

Subscribed and sworn to before me this __day of _______ 20__.

_________________________ ____________________________
Notary Public Commission Expiration Date
________________________
Seal:

My Commission Number

This form MUST be prepared and signed by the offeror/vendor and submitted with all bids or offers on FTA-funded contracts. Bids or offers not accompanied by this form will be REJECTED.
B. **DOMESTIC CONTENT WORKSHEET:**

(Typical Components of Buses from Appendix B to 49 CFR Sec. 661.11, an itemized component listing from the manufacturer that verifies compliance with the Buy America Provisions may be submitted in lieu of this form)

If you plan on using another components listing, you must include it with your bid and place an X in the following box. ❌

<table>
<thead>
<tr>
<th>I. Components</th>
<th>% Domestic</th>
<th>% Value</th>
<th>Dom. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>engines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>transmissions</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>front axle assemblies</td>
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<tr>
<td>rear axle assemblies</td>
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<tr>
<td>drive shaft assemblies</td>
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<td></td>
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<tr>
<td>front suspension assemblies</td>
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<tr>
<td>rear suspension assemblies</td>
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<td></td>
<td></td>
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<tr>
<td>air compressor and pneumatic systems</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>generator, alternator &amp; electrical systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>steering system assemblies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>front and rear air brake assemblies</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>air conditioning compressor assemblies</td>
<td></td>
<td></td>
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<tr>
<td>air conditioning evaporator/condenser assemblies</td>
<td></td>
<td></td>
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<tr>
<td>heating systems.</td>
<td></td>
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<tr>
<td>passenger seats</td>
<td></td>
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<tr>
<td>driver’s seat assemblies</td>
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<tr>
<td>window assemblies</td>
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<tr>
<td>entrance and exit door assemblies</td>
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<tr>
<td>door control systems</td>
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<tr>
<td>destination sign assemblies</td>
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<tr>
<td>interior lighting assemblies</td>
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<td></td>
<td></td>
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<tr>
<td>front and rear end cap assemblies</td>
<td></td>
<td></td>
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<tr>
<td>front and rear bumper assemblies</td>
<td></td>
<td></td>
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<tr>
<td>specialty steel (structural steel tubing etc.) and aluminum extrusions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>aluminum, steel or fiberglass exterior panels and interior trim</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>flooring and floor coverings</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL DOMESTIC CONTENT OF COMPONENTS (%)**
### II. Construction Activities
(Describe Activities)

<table>
<thead>
<tr>
<th>Location of Construction Activities:</th>
<th>% OF DOMESTIC CONSTRUCTION ACTIVITIES:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vehicle Manufacturer</th>
<th>Model</th>
<th>Model Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor Name</th>
<th>Signature</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
C. LOBBYING:


EXECUTE THE FOLLOWING

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

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

The undersigned, ____________________________

(Bidder/Vendor)

certifies, to the best of his or her knowledge and belief, that:

A. 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.

B. 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 (1/96). Note: Language in paragraph "B" herein has been modified in accordance with Section 10 of the Lobbying Disclosure Act of 1995 (Public Law 104-65, to be codified at 2 U.S.C. 1601, et seq.).]

C. The undersigned shall require that the language of this certification be included in the award documents for all sub awards at all tiers (including subcontracts, sub grants, and contracts under grants, loans, and cooperative agreements) and that all Subrecipient's 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.

C. CONTINUED LOBBYING:

[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.

(Bidder/Vendor)

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

______________________________ ________________________________
Signature of BIDDER/VENDOR's Authorized Official Name and Title of BIDDER's Authorized Official

______________________________
Date
SECTION III

CERTIFICATION TO PURCHASER:

The undersigned BIDDER/VENDOR certifies that the vehicle(s) furnished will meet or exceed the specifications.

The BIDDER/VENDOR hereby certifies that it has attached all applicable documentation including:

1. Federal Motor Vehicle Safety Standards (FMVSS)
2. Altoona Test Certification
3. Buy America Certification Form
4. Domestic Content Worksheet
5. Lobbying Certification Form
6. Government wide Debarment & Suspension Certification Form
7. Certification to Purchaser Form
8. Drawing of proposed floor plan.
9. Printed product literature of the vehicle and all ancillary equipment

The undersigned BIDDER/VENDOR certifies that it has read all of the bid documents and agrees to abide by the terms, certifications, and conditions thereof.

<table>
<thead>
<tr>
<th>Name of Company:</th>
<th>Printed Name of Person Completing Form:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address: (City, State, Zip)</td>
<td>SS# or Tax ID #:</td>
</tr>
<tr>
<td>Telephone: (Area Code)</td>
<td>Signature:</td>
</tr>
</tbody>
</table>

Disadvantaged Business Enterprise Information (DBE) | Bidders type of organization (circle)

<table>
<thead>
<tr>
<th>Is your firm a DBE?</th>
<th>Sole Proprietorship</th>
<th>General Proprietorship</th>
</tr>
</thead>
<tbody>
<tr>
<td>(yes)</td>
<td>Corporation</td>
<td>Limited Partnership</td>
</tr>
<tr>
<td>(no)</td>
<td>Other? Please List</td>
<td></td>
</tr>
</tbody>
</table>
**BIDDER/VENDOR CHECKLIST**

THE FOLLOWING CHECKLIST MUST BE COMPLETED BY THE BIDDER/VENDOR BEFORE THE BID IS SUBMITTED.

This checklist will be used to ensure that all required procurement clauses and certifications listed within these special provisions have been read, initialed, and signed by the Bidder/Vendor along with any necessary signed certifications.

Section I. FOR ALL BIDS:  
Bidder’s initial all lines below:

<table>
<thead>
<tr>
<th>Clause</th>
<th>Initial</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMVSS CERTIFICATION: Circled all applicable Standards &amp; Signed?</td>
<td>_____</td>
</tr>
<tr>
<td>A. Incorporation of Federal Transit Administration Terms: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>B. Federal Changes: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>C. DBE Certification: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>D. Air Conditioning Performance: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>E. Interest of Members of or Delegates to Congress: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>F. Prohibited Interest: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>G. Cargo Preference: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>H. Energy Conservation: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>I. Clean Water and Air: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>J. No Obligation By the Federal Government: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>K. Program Fraud and False or Fraudulent Statements: Read?</td>
<td>_____</td>
</tr>
<tr>
<td>L. Contract Work Hours: Read?</td>
<td></td>
</tr>
<tr>
<td>1. Overtime requirements:</td>
<td></td>
</tr>
<tr>
<td>2. Violation; liability for unpaid wages:</td>
<td></td>
</tr>
<tr>
<td>3. Withholding for unpaid wages:</td>
<td></td>
</tr>
<tr>
<td>4. Subcontracts:</td>
<td></td>
</tr>
<tr>
<td>5. Payrolls and basic records:</td>
<td></td>
</tr>
<tr>
<td>M. Civil Rights: Read?</td>
<td></td>
</tr>
<tr>
<td>1. Nondiscrimination:</td>
<td></td>
</tr>
<tr>
<td>2. Equal Employment Opportunity:</td>
<td></td>
</tr>
<tr>
<td>N. Altoona Test Certification: Completed the following?</td>
<td></td>
</tr>
<tr>
<td>1. Report Summary enclosed? Attached?</td>
<td></td>
</tr>
<tr>
<td>2. Report ____________________________: Completed?</td>
<td></td>
</tr>
<tr>
<td>O. Debarment and Suspensions: Read &amp; Understood?</td>
<td></td>
</tr>
<tr>
<td>1. EPLS Report <a href="http://www.epls.gov">www.epls.gov</a> (Must Not be Debarred)</td>
<td></td>
</tr>
</tbody>
</table>

Revision Date: 11/2/2017
CONTINUED BIDDER/VENDOR CHECKLIST

Section II.

A. Buy America Certification: Completed and signed?  ____
B. Domestic Content Worksheet: Calculated, Completed & Signed?  ____
C. Lobbying Certification signed: Completed and signed?  ____

Section III. CERTIFICATION TO PURCHASER Completed and signed?  ____

I hereby attest that each item was reviewed and that my initials above indicate that the item was properly executed on this date.

___________________________________________________ ______________
Bidder/Vendor Company                                               Date

___________________________________________________ ______________
Bidder/Vendor Representative                                       Date
Pre-Award Reviewer
Replace This Blank Page
With A Screen Print
Of The
EPLS Report
NOTE: PAGES 18 THRU 24
ARE TO BE COMPLETED BY ODOT
AT TIME OF THE BID AWARD
SECTION IV  PRE AWARD AUDIT:

A. Purchaser's Certification - 49 CFR 663, subpart B:
The bidder/vendor has certified that the vehicle to be provided will be the same product as described in the advertised specification. (See attached consolidated certification form signed by the bidder/vendor, part III -A). ODOT certifies that the bidder/vendor is responsible and will provide a vehicle that will meet or exceed the specifications.

EXECUTE THE FOLLOWING

PRE-AWARD PURCHASER’S REQUIREMENTS CERTIFICATION

As required by Title 49 of the CFR, Part 663 – Subpart B,

(ODOT)
certifies that the buses to be purchased,

(Number and Description of Buses)
from

(The Manufacturer),
are the same product described in the recipient’s solicitation specification and that the proposed bidder/vendor is a responsible bidder/vendor with the capability to produce a bus that meets the specifications.

Date: __________________________

Signature: __________________________ Title: __________________________
B. **BUY AMERICA - 49 CFR 663, subpart B:**

The total price of this purchase is less than the small purchase threshold of $100,000 and is not subject to Buy America requirements. OR

The vehicles provided by the bidder/vendor (# of vehicles, make, and model) cannot comply with the Buy America requirements, but may qualify for an exception (see attached consolidated certification form signed by the bidder/vendor, part II-A). OR

The bidder/vendor has certified that the vehicles (# of vehicles, make, and model) will comply with the Buy America requirements. (See attached consolidated certification form signed by the bidder/vendor, part II-A). The bidder/vendor has also completed the attached domestic content worksheet. (Or the bidder/vendor has provided a certificate from the manufacturer that lists the domestic content of each component, states that the vehicle is composed of at least 60% domestic content, describes construction activities, and gives the location of construction activities.) The agency certifies that the vehicles provided will meet the Buy America requirements.

**NOTE:** Only one of the following Certifications should be signed, not both.

**PRE-AWARD BUY AMERICA COMPLIANCE CERTIFICATION:**

As required by Title 49 of the CFR, Part 663 – Subpart B,

(ODOT)

is satisfied that the buses to be purchased,

(Number and Description of Buses)

from

(The Manufacturer)

meet all requirements of Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended. The recipient, or its appointed analyst

(The Analyst Not the Manufacturer or Its Agent)

has reviewed documentation provided by the manufacturer, which lists (1) the actual component and subcomponent parts of the buses identified by the manufacturer, country of origin, and cost; and (2) the actual location of the final assembly point for the buses, including a description of the activities that took place at the final assembly point and the cost of final assembly.

_________________________      __________________________
Date:                                          Signature:  Title:

**OR**

If not applicable, execute the following exemption certification

On next page

30 of 35
B. PRE-AWARD BUY AMERICA EXEMPTION CERTIFICATION

For the Procurement of vehicle(s) that require an FTA waiver:

As required by Title 49 of the CFR, Part 663 – Subpart B,

(ODOT)

certifies that there is a letter from FTA that grants a waiver to the buses to be purchased

(Manufacturer, Number and Description of Buses)

from the Buy America requirements under Section 165(b)(1), (b)(2), or (b)(4) of the Surface Transportation Assistance Act of 1982, as amended.

Date:

_____________________________   _____________________________
Signature:      Title:
C. FEDERAL MOTOR VEHICLE SAFETY STANDARDS (FMVSS) - 49 CFR 663, subpart D:

The bidder/vendor has certified that the vehicle complies with relevant FMVSS issued by the National Highway Traffic Safety Administration in 49 CFR Part 571 (see attached FMVSS certification form signed by bidder/vendor). The PURCHASER certifies that the vehicles will meet FMVSS.

EXECUTE THE FOLLOWING:

EXECUTE THE FOLLOWING (Only one of the following FMVSS Certifications should be signed, not both.

PRE-AWARD FMVSS COMPLIANCE CERTIFICATION:

As required by Title 49 of the CFR, Part 663 – Subpart D,

(ODOT)

certifies that it received, at the post-delivery stage, a copy of

(The Manufacturer)

self-certification information stating that the buses,

(Manufacturer, Number and Description of Buses)


__________________________  _____________________________
Date:  Signature:           Title:

OR

NEXT PAGE
C. PRE-AWARD FMVSS EXEMPTION CERTIFICATION:

As required by Title 49 of the CFR, Part 663 – Subpart D,

(ODOT)

certifies that it received at the pre-award stage, a statement from

(The Manufacturer)

indicated that the buses,

(Number and Description of Buses)


______________________________
Date:

______________________________
Signature:  Title:
PRE-AWARD CHECKLIST:

THE FOLLOWING CHECKLIST IS TO BE COMPLETED BY THE BUYER AND ODOT PERSONNEL BEFORE BID IS AWARDED.

This checklist will be used to ensure that all required clauses and certifications are included in the vendor=s returned bid packet and that all required certifications have been signed by the vendor.

Section I. FOR ALL BIDS:  

Buyer=s initial all lines below:

FMVSS CERTIFICATION: Signed by Bidder/Vendor?  

A. Incorporation of Federal Transit Administration Terms: Initialed by Bidder?  
B. Federal Changes: Initialed by Bidder?  
C. DBE Certification: Initialed by Bidder?  
D. Air Conditioning Performance: Initialed by Bidder?  
E. Interest of Members of or Delegates to Congress: Initialed by Bidder?  
F. Prohibited Interest: Initialed by Bidder?  
G. Cargo Preference: Initialed by Bidder?  
H. Energy Conservation: Initialed by Bidder?  
I. Clean Water and Air: Initialed by Bidder?  
J. No Obligation By the Federal Government: Initialed by Bidder?  
K. Program Fraud and False or Fraudulent Statements: Initialed by Bidder?  
L. Contract Work Hours: Initialed by Bidder?  

1. Overtime requirements:  
2. Violation; liability for unpaid wages:  
3. Withholding for unpaid wages:  
4. Subcontracts:  
5. Payrolls and basic records:  

M. Civil Rights: Initialed by Bidder?  

1. Nondiscrimination:  
2. Equal Employment Opportunity:  

N. Altoona Test Certification completed: Initialed by Bidder?  

1. Report Summary enclosed? Attached to bid?  
2. Altoona Test Report # listed by Bidder?  

O. Debarment and Suspensions: Initialed by Bidder?  

CONTINUED PRE- AWARD CHECKLIST:

Section II.

A. Buy America Certification signed: Signed by Bidder/Vendor? _____
B. Domestic Content Worksheet signed: Signed by Bidder/Vendor? _____
C. Lobbying Certification signed: Signed by Bidder/Vendor? _____

Section III. CERTIFICATION TO PURCHASER:

A. Completed and signed? _____

The previous checklist was to determine if the Bidder/Vendor read and completed all required necessary documentation. The following checklist is to determine if ODOT signed and completed the required Certifications.

Section IV. PRE AWARD AUDIT (signed by ODOT STAFF)

A. Purchaser=s Certification - 49 CFR 663, subpart B: Executed by ODOT?
   Pre-Award Purchaser's Requirements Certification: _____
B. Buy America - 49 CFR 663, subpart B: Executed by ODOT?
   Pre-Award Buy America Compliance Certification, or
   Pre-Award Buy America Exemption Certification: _____
C. FMVSS - 49 CFR 663, subpart D: Executed by ODOT?
   Pre-Award FMVSS Compliance Certification, or
   Pre-Award FMVSS Exemption Certification: _____

I hereby attest that each item was reviewed and that my initials above indicate that the item was properly executed on this date.

_________________________________________  ______________________________________
ODOT  Date

_________________________________________  ______________________________________
ODOT Reviewer  Date
NOTE: PAGES 26 THRU 32 ARE TO BE COMPLETED BY THE PURCHASER AT TIME OF VEHICLE DELIVERY
SECTION V POST DELIVERY AUDIT:

A. Purchaser's Certification - 49 CFR 663, subpart C:

After visually inspecting and road testing the contract buses, the agency certifies that the (# of vehicles, make, and model) meet the contract specifications.

- Grantees in areas with populations of 200,000 or less that purchase more than 20 buses.

The agency's resident inspector monitored manufacturing and completed a report providing accurate records of all construction activities. The report addresses how the construction and operation of the vehicles fulfill the contract specifications. After reviewing the report, visually inspecting and road testing the contract buses, the agency certifies that the (# of vehicles, make, and model) meet the contract specifications.

EXECUTE THE FOLLOWING:

NOTE: Only one of the following Certifications should be signed, not both.

POST-DELIVERY PURCHASER'S REQUIREMENTS CERTIFICATION

As required by Title 49 of the CFR, Part 663 – Subpart C, after visually inspecting and road testing the contract buses,

________________________________________________________________________

(The Purchaser)

certifies that the buses,

________________________________________________________________________

(Number and the Description of Buses)

from

________________________________________________________________________

(The Manufacturer),

meet the contract specifications.

____________________

Date:

____________________  ________________

Signature:       Title:

OR

NEXT PAGE
A. POST-DELIVERY PURCHASER’S REQUIREMENTS CERTIFICATION:

As required by Title 49 of the CFR, Part 663 – Subpart C,

________________________________________
(The Purchaser)

certifies that a resident inspector,

________________________________________
(Not an Agent or Employee of the Manufacturer),

was at manufacturing site during the period of manufacture of

________________________________________
(Number and Description of Buses)

The inspector monitored manufacturing and completed a report on the manufacture of the buses providing accurate records of all bus construction activities. The report addresses how the construction and operation of the buses fulfill the contract specifications. After reviewing the report, visually inspecting the buses, and road testing the buses, the recipient certifies that the buses meet the contract specifications.

_______________
Date:

__________________________  __________________________
Signature:                  Title:
B. **BUY AMERICA - 49 CFR 663, subpart C:**

The total price of this purchase is less than the small purchase threshold of $100,000 and is not subject to Buy America requirements.  

OR

The agency certifies that there is a letter from FTA, which grants a waiver to the vehicles provided by the vendor ( # of vehicles, make, and model) from the Buy America requirements, under Section 165 (b)(1), (b)(2), or (b)(4) of the Surface Transportation Assistance Act of 1982, as amended.  

OR

The agency certifies that it is satisfied that the ( # of vehicles, make, and model) meet the requirements of Section 165 (b)(3) . The agency has reviewed documentation provided by the manufacturer that lists the domestic content of each component, states that the vehicle is composed of at least 60% domestic content, describes construction activities, and gives the location of final construction activities.

NOTE: Only one of the following Certifications should be signed, not both.

**POST-DELIVERY BUY AMERICA COMPLIANCE CERTIFICATION:**

As required by Title 49 of the CFR, Part 663 – Subpart C,

( The Purchaser)

certifies that the buses received are in fact what they ordered and are satisfied with the,

(Number and Description of Buses)

from

(The Manufacturer)

meet the requirements of section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended. The recipient or its appointed analyst

(The Analyst Not the Manufacturer or Its Agent)

has reviewed documentation provided by the manufacturer, which lists (1) the actual component and subcomponent parts of the buses identified by the manufacturer, country of origin, and cost; and (2) the actual location of the final assembly point for the buses, including a description of the activities that took place at the final assembly point and the cost of final assembly.

____________________
Date:

____________________
Signature:       Title:

**OR**

If not applicable, execute the following exemption certification

On next page
B. POST-DELIVERY BUY AMERICA EXEMPTION CERTIFICATION:

As required by Title 49 of the CFR, Part 663 – Subpart C,

(The Purchaser)

certifies that there is a letter from FTA, which grants a waiver to the buses received,

(Manufacturer, Number and Description of Buses)

from the Buy America requirements under Section 165(b)(1), (b)(2), or (b)(4) of the Surface Transportation Assistance Act of 1982, as amended.

______________________________
Date:

______________________________  _____________________________
Signature: Title:

Vehicle Vin Numbers:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
C. FEDERAL MOTOR VEHICLE SAFETY STANDARDS (FMVSS) - 49 CFR 663, subpart D:

The vendor has certified that the vehicle complies with relevant FMVSS issued by the National Highway Traffic Safety Administration in 49 CFR Part 571 (see attached FMVSS certification form provided by the bidder upon vehicle delivery). The agency certifies that the vehicles provided meet FMVSS.

EXECUTE THE FOLLOWING:

NOTE: Only one of the following Certifications should be signed, not both.

POST-DELIVERY FMVSS COMPLIANCE CERTIFICATION:

As required by Title 49 of the CFR, Part 663 – Subpart D,

(The Purchaser)

certifies that it received, at the post-delivery stage, a copy of

(The Manufacturer)

self-certification information stating that the buses,

(Manufacturer, Number and Description of Buses)


________________________

Date:

________________________ _____________________________

Signature: Title:

OR

NEXT PAGE
C. POST-DELIVERY FMVSS EXEMPTION CERTIFICATION:

As required by Title 49 of the CFR, Part 663 – Subpart D,

(The Purchaser)

certifies that it received, at the Post-delivery stage, a statement from

(The Manufacturer)

indicating that the buses,

(Number and Description of Buses)


________________________
Date

________________________
Signature                        ______________
                                Title
POST DELIVERY AUDIT

THE FOLLOWING CHECKLIST IS TO BE COMPLETED BY THE BUYER AND ODOT PERSONNEL BEFORE THE VEHICLE(S) ARE ACCEPTED.

Section V VEHICLE DELIVERY CHECKLIST: (to be signed by buyer upon acceptance of vehicle)

Buyer initials all lines below:

A. Purchaser’s Certification - 49 CFR 663, subpart C:
   Post-Delivery Purchaser’s Requirements Certification or
   Post-Delivery Purchaser’s Requirements Certification (Inspector):_____

B. Buy America - 49 CFR 663, subpart C:
   Post-Delivery Buy America Compliance Certification or
   Post-Delivery Buy America Exemption Certification:_____

B. FMVSS - 49 CFR 663, subpart D:
   Post-Delivery FMVSS Compliance Certification or
   Post-Delivery FMVSS Exemption Certification:_____

Section VI CERTIFICATION OF DELIVERY:

By executing this document,

A. You hereby request that a Lien Entry Form – Motor Vehicle be issued naming the Oklahoma Department of Transportation as Secured Party and that said form(s) will be delivered by the purchaser to a local tag agent for executing and

B. Assure the vehicle be used in accordance with the federal regulations and current provisions, as applicable.

I hereby attest that each item was reviewed and that my initials above indicate that the item was properly executed.

____________________________________  ____________________
Purchaser  Date

____________________________________  ____________________
ODOT Reviewer  Date