Pinellas Suncoast Transit Authority

Florida Electric Transit Buses with Charging and Associated Equipment

AGREEMENT FOR ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

THIS AGREEMENT for ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT ("Agreement") is made on October 27, 2021, by and between the Pinellas Suncoast Transit Authority ("PSTA"), an independent special district with its principal place of business located at 3201 Scherer Drive, St. Petersburg, Florida, 33716 and BYD Coach and Bus ("Contractor"), a Limited Liability Company with its principal place of business located at 1800 South Figueroa Street, Los Angeles, CA 90015 (collectively, the "Parties").

WHEREAS, PSTA issued RFP 21-980369 for Electric Transit Buses with Charging and Associated Equipment on July 15, 2021 (the "RFP"); and

WHEREAS, Contractor timely submitted its response to the RFP on or before September 23, 2021 ("Contractor's Response"); and

WHEREAS, PSTA's Board of Directors awarded the contract to Contractor at its duly held Board of Directors meeting on October 27, 2021 (the "Effective Date").

NOW, THEREFORE, in consideration of the mutual promises and agreements set forth herein, and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, the Parties agree as follows:

1. RECITALS. The above recitals are true and correct and incorporated herein by reference.

2. CONTRACT DOCUMENTS. The "Contract Documents" shall mean and refer to this Agreement, the RFP including all exhibits attached thereto including any and all duly executed and issued addenda (attached hereto as **Exhibit 1**), any and all Purchase Orders (as defined below and attached as composite **Exhibit 2**), Contractor's Best and Final Offer (BAFO), if any (attached hereto as **Exhibit 3**), and Contractor's Response (attached hereto as **Exhibit 4**). All of the foregoing are incorporated herein by reference and are made a part of this Agreement. In interpreting this Agreement and resolving any ambiguities or conflicts between this Agreement and the exhibits, this Agreement takes precedence over the exhibits and any inconsistency between the exhibits will be resolved in the following order:

Exhibit 1	RFP
Exhibit 2	Purchase Order(s)
Exhibit 3	Contractor's BAFO
Exhibit 4	Contractor's Response

3. SCOPE OF SERVICES. Contractor, at the direction of PSTA, shall furnish to PSTA Electric Transit Buses with Charging and Associated Equipment as described in, and in accordance with the specifications, tasks, and scope of work set forth in the RFP (the "Services"), and in the amount set forth in the RFP. Contractor acknowledges that it has read the specifications and understands them. Contractor also agrees to provide electric transit buses with charging and associated equipment to all permissible assignees of PSTA. PSTA's permissible assignees shall have the option to purchase electric transit buses and charging and associated equipment in accordance with the terms and conditions of the RFP, and specifically SP 3 of the RFP.

4. EFFECTIVE DATE AND TERM OF AGREEMENT. This Agreement shall become effective and commence on the Effective Date and shall remain in effect for five (5) years.

5. TERMS OF PERFORMANCE.

5.01. Time for Completion/Purchase Orders. PSTA will issue purchase orders for the electric buses with charging and associated equipment it needs provided under this Agreement ("Purchase Order(s)"). Upon issuance, the Purchase Order shall be appended to this Agreement and incorporated as an exhibit, Contractor shall immediately begin providing the Services pursuant to the Purchase Order, and all work and deliverables shall be completed by the date set forth in the Purchase Order, unless modified in writing by the Parties. In the event a Purchase Order approved during the term of the Contract Term has a completion date beyond the Contract Term, the terms and conditions of this Agreement shall be automatically extended through the completion of the Purchase Order to the full satisfaction of PSTA.

5.02. Representatives. Prior to the start of any ordering or supplying the Services under this Agreement, Contractor shall designate a primary and alternate representative, who will have management responsibility for the Services and who will have authority to act on technical matters and resolve problems with the Services, Purchase Order(s), and the Contract Documents, to PSTA in writing. Such designation shall include the contact information (including phone numbers) of Contractor's representative. PSTA will advise Contractor in writing of the personnel who will represent PSTA in the administration of the Contract Documents. Such writing from PSTA may include the specific duties of each individual and each representative's limits of authority.

5.03. Non-exclusive Contract. PSTA specifically reserves the right to contract with other entities for the Services described in the Contract Documents or for similar products if it deems, in its sole discretion, such action to be in PSTA's best interest.

5.04. Contractor Responsibility. Contractor shall provide electric buses with charging and associated equipment of first quality, and the workmanship must be in accordance with customary standards of the various trades and industries involved in the manufacturing and furnishing of such products. The Services and the work associated therewith shall be of high-quality in all respects. No advantage will be taken by Contractor in the omission of any part or detail of the Services. Contractor hereby assumes responsibility for all materials, equipment, and processes used in the manufacturing and furnishing of the electric buses and charging and associated equipment, whether the same is manufactured by Contractor or purchased readymade from a source outside Contractor's company.

5.05. Compliance with Laws. Contractor shall comply with all federal, state, county, and local laws, rules and/or regulations, and lawful orders of public authorities including those set forth in this Agreement and that, in any manner, could bear on the provision of the Services under the Contract Documents. Omission of any applicable laws, ordinances, rules, regulations, standards or orders by PSTA in the Contract Documents shall be construed as an oversight and shall not relieve Contractor of its obligations to comply with such laws fully and completely. Upon request, Contractor shall furnish to PSTA certificates of compliance with all such laws, orders and regulations. Contractor shall be responsible for obtaining all necessary permits and licenses required for performance under this Agreement.

6. COMPENSATION. In consideration of Contractor's faithful performance of the Contract Documents, PSTA agrees to pay Contractor pursuant to the rates and pricing set forth in Contractor's Response or Contractor's BAFO, if any. However, all payments to Contractor individually and in the aggregate shall not exceed the Contract Total. Payment shall be made in accordance with the RFP and the Florida Prompt Payment Act, section 218.70, *et seq.*, Florida Statutes.

6.01. Invoices. All invoices shall be submitted in accordance with the Florida Prompt Payment Act, section 218.72, et seq., Florida Statutes, with all details prescribed by PSTA, and delivered to the following address:

Pinellas Suncoast Transit Authority
Attention: Finance Department/Accounts Payable
Purchase Order or Contract #: C-22-MT-002
3201 Scherer Drive
St. Petersburg, Florida 33716

or via electronic mail to:
AccountsPayable@psta.net

6.02. *Disputed Invoices.* In the event of a disputed invoice, only that portion so contested may be withheld from payment and the undisputed portion shall be due and payable on the terms set forth herein.

6.03. *Availability of Funds*. Contractor understands that the funds are not presently available under this Agreement beyond the current fiscal year. PSTA's obligation for performance under this Agreement beyond the current fiscal year is contingent upon the availability of funds from which payments can be made. PSTA is not legally liable for any payment that may arise under this Agreement beyond the current fiscal year, until the Contractor receives a written notice of availability of funds from the PSTA's Contracting Officer.

7. WARRANTIES AND COVENANTS.

7.01. *Patent, Trademark, Copyright, and Trade Secret.* Contractor warrants that the Services, and all goods and work associated therewith, do not infringe on any patent, trademark, copyright or trade secret of any third parties and agrees to defend, indemnify and hold PSTA, its officers, agents, employees, trustees and its successors and assigns, harmless from and against any and all liabilities, loss, damage or expense, including, without limitation, court costs and reasonable attorneys' fees, arising out of any infringement or claims of infringement of any patent, trade name, trademark, copyright or trade secret by reason of the sale or use of any goods or services purchased under this Agreement. PSTA shall promptly notify Contractor of any such claim. PSTA makes no warranty that the production, sale or use of goods or services under this Agreement will not give rise to any such claim and PSTA shall not be liable to Contractor for any such claim brought against Contractor. If any invention, improvement, or discovery of the Contractor is conceived or first actually reduced to practice in the course of providing the Services under this Agreement, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the Contractor agrees to notify the PSTA immediately and provide a detailed report. The rights and responsibilities of the Contractor and PSTA with respect to such invention, improvement, or discovery will be determined in accordance with applicable Federal laws, regulations, policies, and any waiver thereof.

7.02. *Covenants against Gratuities.* Contractor warrants that he or she has not offered or given gratuities (in the form of entertainment, gifts, or otherwise) to any official or employee of PSTA with a view toward securing favorable treatment in the awarding, amending, or evaluating performance of this Agreement.

7.03. *E-Verify.* Contractor shall utilize the U.S. Department of Homeland Security's E-Verify System to verify the employment eligibility of: (a) all persons employed by Contractor throughout the term of this Agreement; and (b) all persons, including subcontractors, retained or hired by Contractor, regardless of compensation, to perform work on the Services provided pursuant to the Contract Documents.

8. DELAY IN PERFORMANCE/FORCE MAJEURE.

8.01. *Time of the Essence.* The timely receipt of the Services and deliverables to PSTA is essential. If the Services and all deliverables under each Purchase Order are not received by PSTA within the date specified in each Purchase Order, PSTA may cancel the unfilled portion of the Purchase Order and this

Agreement for cause, purchase substitutes elsewhere, and recover from Contractor any increased costs and damages thereby incurred by PSTA.

8.02. Unavoidable Delay. If completion of the Services under any Purchase Order is unavoidably delayed, PSTA may, in its sole and absolute discretion, extend the time for completion for a determined number of days of excusable delay. A delay is unavoidable only if the delay was not reasonably expected to occur in connection with or during Contractor's performance; was not caused directly or substantially by negligent errors, omissions, or mistakes of Contractor, its subcontractors, or its suppliers or their agents; was substantial; and, in fact, caused Contractor to miss delivery dates and could not adequately have been guarded against by contractual or legal means.

8.03. No Damages for Delay. Contractor shall not be entitled to any claim for damages on account of hindrances or delays in the work from any cause whatsoever, including any delays or hindrances caused by PSTA. This paragraph shall include, but not be limited to, any actions which result in delays in scheduling, substantial changes in scope of the Services or deliverables or substantial increases in the costs of performing the work under the Contract Documents.

8.04. Notification. Contractor will notify PSTA as soon as Contractor has, or should have, knowledge that an event has occurred which will delay completion of the Services under a Purchase Order. Within five (5) working days, Contractor will confirm such notice in writing, furnishing as much detail as is available and including any request for extension of time. Contractor shall supply, as soon as such data is available, any reasonable proofs that are required by PSTA to make a decision on any request for extension. PSTA will examine the request and any documents supplied by Contractor and will determine if Contractor is entitled to an extension and the duration of such extension. PSTA will notify Contractor of its decision in writing. It is expressly understood and agreed that Contractor will not be entitled to any extension and the granting of such extension is in the sole discretion of PSTA. It is further expressly understood that Contractor shall not be entitled to any damages or compensation, and will not be reimbursed for any losses, on account of delays resulting from any cause.

9. DISPUTES, BREACHES, DEFAULTS, OR OTHER LITIGATION.

9.01. Rights and Remedies. The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by PSTA or Contractor shall constitute a waiver of any right or duty afforded any of them under this Agreement, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

9.02. Attorneys' Fees. In the event of legal action or other proceeding arising under this Agreement, PSTA shall be entitled to recover from Contractor all its reasonable attorneys' fees and cost incurred by PSTA in the prosecution or defense of such action, or in any post-judgment or collection proceedings and whether incurred before suit, at the trial level or at the appellate level. This shall include any bankruptcy proceedings filed by or against Contractor. PSTA also shall be entitled to recover any reasonable attorneys' fees and costs incurred in litigating the entitlement to attorneys' fees and costs, as well as in determining the amount of attorneys' fees and costs due to PSTA. The reasonable costs to which PSTA will be entitled include costs that are taxable under any applicable statute, rule, or guideline, as well as costs of investigation, copying costs, electronic discovery costs, mailing and delivery charges, costs of conducting legal research, consultant and expert witness fees, travel expenses, court reporter fees and mediator fees, regardless of whether such costs are taxable under any applicable statue, rule or guideline.

10. INDEMNIFICATION.

10.01 Indemnification. The Parties recognize that Contractor is an independent contractor. Contractor

agrees to assume liability for and indemnify, hold harmless, and defend PSTA, its board members, officers, employees, agents and attorneys, of, from, and against all liability and expense, including reasonable attorneys' fees, in connection with any and all claims, demands, damages, actions, causes of action, and suits in equity of whatever kind or nature, including claims for personal injury, property damage, equitable relief, or loss of use, arising out of the execution, performance, nonperformance, or enforcement of this Agreement, whether or not due to or caused by the negligence of PSTA, its board members, officers, employees, agents, and/or attorneys excluding only the sole negligence of PSTA, its officers, employees, agents, and attorneys. This includes claims made by the employees of Contractor against PSTA, and Contractor hereby waives its entitlement, if any, to immunity under Section 440.11, Florida Statutes. Contractor's liability hereunder shall include all attorneys' fees and costs incurred by PSTA in the enforcement of this indemnification provision. Notwithstanding anything contained herein to the contrary, this indemnification provision shall not be construed as a waiver of any immunity from or limitation of liability to which PSTA is entitled to pursuant to the doctrine of sovereign immunity or Section 768.28, Florida Statutes. The obligations contained in this provision shall survive termination of this Agreement, however terminated, and shall not be limited by the amount of any insurance required to be obtained or maintained under this Agreement.

10.02 Control of Defense. Subject to the limitations set forth in this provision, Contractor shall assume control of the defense of any claim asserted by a third party against PSTA arising from or in any way related to this Agreement and, in connection with such defenses, shall appoint lead counsel, in each case at Contractor's expense. Contractor shall have the right, at its option, to participate in the defense of any third party claim, without relieving Contractor of any of its obligations hereunder. If Contractor assumes control of the defense of any third party claim in accordance with this paragraph, Contractor shall obtain the prior written consent of PSTA before entering into any settlement of such claim. Notwithstanding anything to the contrary in this provision, Contractor shall not assume or maintain control of the defense of any third party claim, but shall pay the fees of counsel retained by PSTA and all expenses including experts' fees, if (i) an adverse determination with respect to the third party claim would, in the good faith judgment of PSTA, be detrimental in any material respect of PSTA's reputation; (ii) the third party claim seeks an injunction or equitable relief against PSTA; or (iii) Contractor has failed or is failing to prosecute or defend vigorously the third party claim. Each party shall cooperate, and cause its agents to cooperate, in the defense or prosecution of any third party claim and shall furnish or cause to be furnished such records and information, and attend such conferences, discovery proceedings, hearings, trials, or appeals, as may be reasonably requested in connection therewith.

11. MISCELLANEOUS PROVISIONS.

11.01 Entire Agreement. The Contract Documents, including all exhibits, constitute the entire agreement between the parties with respect to the subject matter hereof and supersedes all previous written or oral negotiations, agreements, proposals and/or understandings. There are no representations or warranties unless set forth in the Contract Documents.

11.02 Notices. All notices required or made pursuant to this Agreement shall be made in writing and sent by certified U.S. mail, return receipt requested, addressed to the following:

To PSTA:
Pinellas Suncoast Transit Authority
Attn: Brad Miller, CEO
3201 Scherer Drive
St. Petersburg, FL 33716

To Contractor:
_____
_____
_____
_____

With required copy to:

Alan S. Zimmet, B.C.S.
Bryant Miller Olive
One Tampa City Center
Suite 2700
Tampa, FL. 33602

Either party may change its above noted address by giving written notice to the other party in accordance with the requirements of this section.

11.03 *Waiver of Remedies for any Breach*. In the event that PSTA elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Agreement, such waiver by PSTA shall only be valid if set forth in writing and shall not limit PSTA's remedies for any succeeding breach of that or of any other term, covenant, or condition of this Agreement.

11.04 *Modification.* The Contract Documents, including the scope, specification, and details of the Services may only be modified by written agreement of the Parties. No modification shall serve to increase the Contract Total unless such change has been approved by PSTA's Board of Directors prior to any work being performed that would serve to increase the Contract Total.

11.05 *Headings and Section References.* The headings and section references in this Agreement are inserted only for the purpose of convenience and shall not be construed to expand or limit the provisions contained in such sections.

11.06 *Authorization.* Both parties to this Agreement represent and warrant that they are authorized to enter into this Agreement without the consent and joinder of any other party and that the parties executing this Agreement have full power and authority to bind their respective parties to the terms hereof.

11.07 *Assignment*. The terms and provisions of this Agreement shall be binding upon the Parties and their respective partners, successors, heirs, executors, administrators, assigns and legal representatives. Notwithstanding the foregoing, a party's rights and obligations under this Agreement may only be transferred, assigned, sublet, mortgaged, pledged or otherwise disposed of or encumbered in any way with the other party's prior written consent.

11.08 *Severability*. If any one or more provisions of this Agreement shall be held to be invalid, illegal, or unenforceable in any respect by a court of competent jurisdiction, the validity, legality, and enforceability of the remaining provisions hereof shall not in any way be affected or impaired thereby and this Agreement shall be treated as though the invalidated portion(s) had never been a part hereof.

11.09 *Electronic Signatures*. This Agreement may be executed by electronic signature technology and such electronic signature shall act as the Parties' legal signatures on this Agreement and shall be treated in all respects as an original handwritten signature.

11.010 *Counterparts*. This Agreement may be executed in one or more counterparts, any one of which need not contain the signatures of more than one party, but all such counterparts taken together will constitute one and the same instrument.

(SIGNATURES ON FOLLOWING PAGE)

IN WITNESS WHEREOF the Parties hereto have caused this Agreement to be duly executed on the date first above written.

CONTRACTOR:

By:_____

_____
Print Name:

Title:

PSTA:

By: _____
Brad Miller, CEO

Attest:

_____
Rachael Cappolla, Executive Assistant

WITNESS/ATTEST:

By:_____

By: _____

Print Name: _____

Approved as to form:

Alan S. Zimmet, General Counsel

Exhibit 1

Pinellas Suncoast Transit Authority

Florida Electric Transit Buses with Charging and Associated Equipment

Request for Proposals

Pinellas Suncoast Transit Authority

Florida Electric Transit Buses with Charging and Associated Equipment

RFP 21-980369

July 15, 2021

Contents

SECTION 1: NOTICE OF REQUEST FOR PROPOSALS

NR 1. Description of the Work to be Done

The Pinellas Suncoast Transit Authority (the Agency or PSTA) is requesting proposals for the manufacture and delivery of Electric Transit Buses with charging and associated equipment as a Purchase Schedule for the State of Florida , and in accordance with the terms and conditions set forth in this Solicitation. The Contract shall be a firm-fixed-price Contract.

Specifically, the Agency is requesting the following types of buses: Florida Electric Transit Buses with charging and associated equipment.

NR 2. Obtaining Proposal Documents

Proposal documents may be obtained electronically, at https://psta.bonfirehub.com.

NR 3. Proposal Due Date and Submittal Requirements

Proposals must be received by 10:00 am local time on Tuesday, September 14, 2021.

1. Proposals shall be submitted to the following address:
   https://psta.bonfirehub.com

2. A Proposal is deemed to be late if it is received by the Agency after the deadline stated above. Proposals received after the submission deadline will be rejected.

NR 4. Validity of Proposals

Proposals shall remain valid for a period of 180 days.

NR 5. Pre-Proposal Meeting Information (Optional)

A Pre-Proposal Meeting will be held on Tuesday July 27, 2021. The meeting will convene at 10:00 am, via ZOOM meeting: https://us02web.zoom.us/j/85439108385?pwd=V2hPTmxuSzVPTmpiYk5RT2xkcDFLZz09
Meeting ID: 854 3910 8385 Passcode: 1234

Prospective Proposers are requested to submit written questions to the Contract administrator, identified below, in advance of the Pre-Proposal Meeting. In addition, questions may be submitted up to the date specified in "Proposed Schedule for the Procurement." Responses will be shared with all prospective Proposers. Prospective Proposers are reminded that any changes to the RFP will be by written addenda only, and that nothing stated at the Pre-Proposal Meeting shall change or qualify in any way any of the provisions in the RFP and shall not be binding on the Agency.

Contracting Officer's Contact Information:
Name: Alvin R. Burns Jr.
Title: Director of Procurement
Address: 3201 Scherer Drive, St. Petersburg, FL 33716
Email: aburns@psta.net

Additional contact: Edith Randle

Title: Purchasing Agent I
Address: 3201 Scherer Drive, St. Petersburg, FL 33716
Email: erandle@psta.net

Identification of Source of Funding
Financial support for this Project is provided through financial assistance grants from the Federal Transit Administration (FTA), State of Florida, and other local funding sources.

Signed and Dated for Posting

_____ _____
Signature/Title Date

SECTION 2: INSTRUCTIONS TO PROPOSERS

IP 1. Proposed Schedule for the Procurement

The following is the solicitation schedule for Proposers:

- Pre-Proposal Meeting/teleconference: Tuesday July 27, 2021, at 10:00 am local time.
- Deadline for Proposer questions, "clarifications and requests for deviations" : Tuesday September 7, 2021, at 10:00 am local time.
- Responses to Proposer's questions, communications and/or Agency addenda: Friday, September 10, 2021.
- Proposal Due Date: Tuesday, September 14, 2021, at 10:00 am local time.

IP 2. Obtaining Proposal Documents

Proposal documents may be obtained electronically at https://psta.bonfirehub.com .

IP 3. Pre-Proposal Meeting/Information for Proposers

A Pre-Proposal Meeting will be held on Tuesday, July 27, 2021, at 10:00 am. The meeting will convene at 10:00 am. Proposers can also participate via ZOOM. The instructions are as follows: https://us02web.zoom.us/j/85439108385?pwd=V2hPTmxuSzVPTmpiYk5RT2xkcDFLZz09 Meeting ID: 854 3910 8385 Passcode: 1234. Prospective Proposers are urged to make every effort to attend this meeting.

Prospective Proposers are requested to submit written questions to the Contracting Officer, identified above, in advance of the Pre-Proposal Meeting. In addition, questions may be submitted up to the date specified in "Proposed Schedule for the Procurement." Responses will be shared with all prospective Proposers. Prospective Proposers are reminded that any changes to the RFP will be by written addenda only, and nothing stated at the Pre-Proposal Meeting shall change or qualify in any way any of the provisions in the RFP and shall not be binding on the Agency.

IP 4. Questions, Clarifications and Omissions

All correspondence, communication and contact in regard to any aspect of this solicitation or offers shall be only with the Contracting Officer identified above, Alvin R. Burns Jr. and Edith Randle. Unless otherwise instructed by the Contracting Officer, Proposers and their representatives shall not make any contact with or communicate with any member of the Agency, or its employees and consultants, other than the designated Contracting Officer, in regard to any aspect of this solicitation or offers.

At any time during this procurement up to the time specified in "Proposed Schedule for the Procurement," Proposers may request, in writing, a clarification or interpretation of any aspect, a change to any requirement of the RFP, or any addenda to the RFP. Requests may include suggested substitutes for specified items and for any brand names, which whenever used in this solicitation shall mean the brand name or approved equal. Such written requests shall be made to the Contracting Officer. The Proposer making the request shall be responsible for its proper delivery to the Agency as identified on the form Request for Pre-Offer Change or Approved Equal. Any request for a change to any requirement of the Contract documents must be fully supported with technical data, test results or other pertinent information showing evidence that the exception will result in a condition equal to or better than that required by the RFP, without a substantial increase in cost or time requirements.

All responses to Request for Pre-Offer Change or Approved Equal shall be provided to all Proposers. Any response that is not confirmed by a written addendum shall not be official or binding on the Agency.

If it should appear to a prospective Proposer that the performance of the Services under the Contract, or any of the matters relating thereto, is not sufficiently described or explained in the RFP or Contract Documents, or that any conflict or discrepancy exists between different parts of the Contract Documents or with any federal, state, local or Agency law, ordinance, rule, regulation, or other standard or requirement, then the Proposer shall submit a written request for clarification to the Agency within the time period specified above.

IP 5. Addenda to RFP

The Agency reserves the right to amend the RFP at any time in accordance with "Proposed Schedule for the Procurement." Any amendments to the RFP shall be described in written addenda. Notification of or the addenda also will be distributed to all such prospective Proposers officially known to have received the RFP. Failure of any prospective Proposer to receive the notification or addenda shall not relieve the Proposer from any obligation under the RFP therein. All addenda issued shall become part of the RFP. Prospective Proposers shall acknowledge the receipt of each individual addendum in their Proposals on the form Acknowledgement of Addenda. Failure to acknowledge in the Proposal receipt of addenda may at the Agency's sole option disqualify the Proposal.

If the Agency determines that the addenda may require significant changes in the preparation of Proposals, the deadline for submitting the Proposals may be postponed no fewer than ten (10) days from the date of issuance of addenda or by the number of days that the Agency determines will allow Proposers sufficient time to revise their Proposals. Any new Due Date shall be included in the addenda.

IP 6. DBE Requirements for Transit Vehicle Manufacturers

Pursuant to Title 49, Code of Federal Regulations, Part 26.49, a Proposer, as a condition of being authorized to respond to this solicitation, must certify by completing the form DBE Approval Certification that it has on file with the Federal Transit Administration (FTA) an approved or not disapproved annual disadvantaged business enterprise (DBE) subcontracting participation goal.

IP 7. Buy America Certification

This Contract is subject to the "Buy America" requirements of 49 United States Code (USC) §5323(j) and 49 Code of Federal Regulations (CFR) Part 661, as may be amended from time to time, and applicable federal regulations. Prospective Proposers' attention is directed to 49 CFR §661.11, "Rolling Stock Procurements." Prospective Proposers have the responsibility to comply with the cited and any governing statutes and regulations, including official interpretations.

A Proposer shall submit to the Agency the appropriate Buy America certification, included in this document, with all offers on FTA-funded contracts. Proposals that are not accompanied by a properly completed Buy America certification are subject to the provisions of 49 CFR 661.13 and will be rejected as nonresponsive.

The two signature blocks on the Buy America certificate are mutually exclusive. Proposers shall sign only one signature block on the certificate. Signing both signature blocks will make the Proposal nonresponsive. A false certification is a criminal act in violation of 18 USC §1001.

A Proposer who has submitted an incomplete Buy America certificate or an incorrect certificate of noncompliance through inadvertent or clerical error (but not including failure to sign the certificate, submission of certificates of both compliance and noncompliance, or failure to submit any certification), may submit to the FTA Chief Counsel within ten (10) days of Proposal opening a written explanation of the circumstances surrounding the submission of the incomplete or incorrect certification in accordance with 28 USC §1746, sworn under penalty of perjury, stating that the submission resulted from inadvertent or clerical error. The Proposer will also submit evidence of intent, such as information about the origin of the

product, invoices, or other working documents. The Proposer will simultaneously send a copy of this information to the Agency.

The FTA Chief Counsel may request additional information from the Proposer, if necessary. The Agency may not make Contract award until the FTA Chief Counsel issues his or her determination, except as provided in 49 CFR Part 661.15(m).

Certification based on ignorance of proper application of the Buy America requirements is not an inadvertent or clerical error.

A waiver from the Buy America provisions will be sought by the Agency from the FTA for the proposed awardee, if the grounds for a waiver exist. All Proposers seeking a waiver must submit to the Agency a timely request in writing, which shall include the facts and justification to support the granting of the waiver. Such waiver from the Buy America provisions may be granted if the FTA determines the following:

1. Their application would be inconsistent with the public interest;
2. Materials are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
3. Inclusion of domestic material will increase the cost of the overall Contract by more than 25 percent.

Any party may petition the FTA to investigate a successful Proposer's compliance with the Buy America certification. The procedures are set out in 49 CFR Part 661.15. If the FTA determines that the evidence indicates noncompliance, the FTA will require the Agency to initiate an investigation. The successful Proposer has the burden of proof to establish compliance with its certification. If the successful Proposer fails to so demonstrate compliance, then the successful Proposer will be required to substitute sufficient domestic materials without revision of the original Contract terms. Failure to do so will be a breach of the Contract and may lead to the initiation of debarment proceedings under 49 CFR Part 29.

IP 8. Conditions, Exceptions, Reservations or Understandings

Proposers are cautioned to limit exceptions, conditions and limitations to the provisions of this RFP, as they may be determined to be so fundamental as to cause rejection of the Proposal for not responding to the requirements of the RFP.

Any and all Deviations must be explicitly, fully and separately stated in the Proposal by completing the Form for Proposal Deviation, setting forth at a minimum the specific reasons for each Deviation so that it can be fully considered and, if appropriate, evaluated by the Agency. All Deviations shall be evaluated in accordance with the appropriate evaluation criteria and procedures and may result in the Proposer receiving a less favorable evaluation than without the Deviation.

The Form for Proposal Deviation shall be included in the Technical package.

IP 9. Protest Procedures

All protests must be in writing, stating the name and address of the protestor, a contact person, Contract number and title. Protests shall specify in detail the grounds of the protest and the facts supporting the protest.

IP 9.1 Address

All protests must be addressed as follows:

- Agency contact: Deborah C. Leous, Chief Financial Officer
- For special delivery or hand delivery: 3201 Scherer Drive, St. Petersburg, FL 33716
- For U.S. mail: 3201 Scherer Drive, St. Petersburg, FL 33716

Protests not properly addressed to the address shown above may not be considered by the Agency.

Copies of the Agency's protest procedures and the protest provisions of FTA Circular 4220.1F or its successor may be obtained from Alvin Burns aburns@psta.net or Edith Randle erandle@psta.net . Proposals will be opened and a Notice of Award will be issued by the Agency in accordance with the Agency's protest procedures and the protest provisions of FTA Circular 4220.1F or its successor.

IP 9.2 Pre-Proposal Protests

Pre-Proposal protests are protests based upon the content of the solicitation documents. Three copies of Pre-Proposal protests must be received by the Agency's office no later than fifteen (15) calendar days prior to the Due Date. Protests will be considered and either denied or sustained in part or in whole, in writing, in a manner that provides verification of receipt, prior to the Due Date for Proposals. A written decision specifying the grounds for sustaining all or part of or denying the protest will be transmitted to the protestor prior to the Due Date for Proposals in a manner that provides verification of receipt prior to the Due Date for Proposals. If the protest is sustained, then the Proposal Due Date may be postponed and an addendum issued to the solicitation documents or, at the sole discretion of the Agency, the solicitation may be canceled. If the protest is denied, then Proposals will be received and opened on the scheduled date unless a protest is filed with the FTA. See "FTA Review," below.

IP 9.3 Protests on the Recommended Award

All Proposers will be notified of the recommended award. This notice will be transmitted to each Proposer at the address contained in its Proposal form in a manner that provides verification of receipt. Any Proposer whose Proposal has not lapsed may protest the recommended award on any ground not specified in "Pre-Proposal Protests," above. Three (3) copies of a full and complete written statement specifying in detail the grounds of the protest and the facts supporting the protest must be received by the Agency at the appropriate address in "Address," above, no later than fifteen (15) calendar days after the date such notification is received. Prior to the issuing of the Notice of Award, a written decision stating the grounds for allowing or denying the protest will be transmitted to the protestor and the Proposer recommended for award in a manner that provides verification of receipt.

IP 9.4 FTA Review

After such administrative remedies have been exhausted, an interested party may file a protest with the Federal Transit Administration of the U.S. Department of Transportation pursuant to the procedures provided in the FTA C 4220.1F or its successor. FTA review is limited to the alleged failure of the Agency to have written protest procedures, the alleged failure of the Agency to follow those procedures, the alleged failure of the Agency to review a protest, or the alleged violation of federal law or regulation.

IP 10. Preparation of Proposals

IP 10.1 Use of Proposal Forms

Proposers are advised that the forms contained in this RFP are required to be used for submission of a Proposal.

IP 10.2 Multiple Award

PSTA will make the Contract awards, if any, to the responsive and responsible Proposes who are in compliance with the conditions and requirements of this solicitation, and who meets the criteria outlined in the Evaluation Criteria, of this solicitation, as determined by the PSTA Board of Directors. PSTA reserves the right to award multiple contracts.

IP 10.3 Proposal Format Requirements

Proposals shall be submitted to https://psta.bonfirehub.com/portal

Proposals shall be typed. Proposals should be prepared as simply and economically as possible while providing straightforward, concise information of the Proposer's capabilities to satisfy the requirements of this RFP. Fancy colored displays, promotional material, etc. are neither necessary nor desired. Technical literature about the Proposer's experience and qualifications must be included. The emphasis should be on completeness and clarity of content. Unnecessarily elaborate proposals or lengthy presentations are not desired.

Proposals shall include a "Table of Contents" identifying the page numbers of where to find the various sections included in the proposal. Failure by a Proposer to respond to any of the following requirements may be a basis for elimination from consideration during the evaluation. Do not provide promotional or advertising information, unless this information is requested and/or is necessary to support the technical submittal.

Section 1: Technical Proposal Requirements

Proposers shall submit the following information:

1. Letter of Transmittal
2. Technical Proposal
3. Acknowledgement of Addenda
4. Contractor Service and Parts Support Data
5. Form for Proposal Deviation (without price data)
6. Vehicle Questionnaire
7. References and Non-Priced Information
8. Engineering organization chart, engineering change control procedure, field modification process
9. Manufacturing facilities plant layout, other contracts, staffing
10. Production and delivery schedule and other Contract commitments for the duration of this Contract
11. Management Plan This plan shall indicate the key personnel assigned to PSTA's account. Assigned personnel shall include at a minimum, Engineer to conduct pre-build conference, Account Representative, Warranty Administrator, and Parts and Support manager."

Section 2: Price Proposal Requirements

Each Price Proposal shall be on the prescribed Proposal form(s) and shall be for the entire Contract, including all Proposal items. Proposer shall submit the below items in the Price Proposal section:

1. Letter of Transmittal
2. Pricing Schedule, (including but not limited to such pricing elements as option buses, spare parts package, manuals, training, special tools and test equipment)

The Proposer is required to complete and execute the Agency's Pricing Schedule, contained as part of the Proposal documents, and provide same in the Price Proposal. The Contractor shall be liable for payment of all local taxes applicable to the complete bus as delivered and should add these amounts to the Proposal price.

Section 3: Qualification Section Requirements

The following are the requirements for qualifying responsible Proposers:

1. Pre-Award Evaluation Data Form
2. A copy of the three (3) most recent financial statements audited by an independent third party or a statement from the Proposer regarding how financial information may be reviewed by the Agency
3. Letter for insurance, indicating the Proposer's ability to obtain the insurance coverage in accordance with the RFP requirements
4. Form for Proposal Deviation, if applicable (without price data)
5. Proposal Form
6. All federal certifications: Buy America Certification, Debarment and Suspension Certification for Prospective Contractor, Debarment and Suspension Certification (Lower-Tier Covered Transaction), Non-Collusion Affidavit, Lobbying Certification, Certificate of Compliance with Bus Testing Requirement, DBE Approval Certification, and Federal Motor Vehicle Safety Standards

Section 4: Proprietary/Confidential Information Package Requirements

The Proposer is directed to collect and submit any information it deems to be proprietary or confidential in nature in a separate marked and sealed package. If there is no confidential information, then the Proposer should include a statement to that effect. Subject package shall be submitted in accordance with the terms and conditions governing the submittal of Proposer's Proposal to this RFP. Blanket-type identification by designating whole pages or sections as containing proprietary information, trade secrets or confidential commercial and financial information will not ensure confidentiality. The specific proprietary information, trade secrets or confidential commercial and financial information must be clearly identified as such.

All Proposals submitted are public records subject to production unless specifically exempt by Florida Statutes. Proposals which contain information that is "trade secret" as defined in Section 812.081, Florida Statutes, or otherwise exempt from Chapter 119, Florida Statutes shall be designated as such and the trade secret or exempt information shall be explicitly identified. However, any information marked as "trade secret" or exempt may be produced by PSTA in response to a public records request if PSTA determines, in its sole discretion, that the information does not meet the definition of "trade secret" in Section 812.081 and is not exempt from Chapter 119, Florida Statutes. Proposers may not designate its entire Proposal as confidential. Proposers may not designate its cost Proposal or any required Proposal forms or certifications as confidential.

IP 10.4 Signing of Proposal Forms

Proposals shall include firm name (and, in the event that the Proposer is a joint venture, the names of the individual firms comprising the joint venture); business address; and the name, title, business address, telephone number, and email address of the responsible individual(s) who may be contacted during the Proposal evaluation period for scheduling oral presentations and for receiving notices from the Agency. The Proposer shall submit with its Proposal a copy of the joint venture agreement.

Proposals shall be signed by those individual(s) authorized to bind the Proposer. The Proposer shall submit evidence of the official's authority to act for and bind the Proposer in all matters relating to the Proposal. (In the event that the Proposer is a joint venture or consortium, a representative of each of the members of the joint venture or consortium shall execute the Proposal. Each joint venture or consortium member is jointly and severally liable for the joint venture or consortium.)

IP 10.5 Modification or Withdrawal of Proposals

A modification of a Proposal already received will be accepted by the Agency only if the modification is received prior to the Proposal Due Date. All modifications shall be made in writing and executed and submitted in the same form and manner as the original Proposal.

A Proposer may withdraw a Proposal already received prior to the Proposal Due Date by submitting to the Agency, in the same manner as the original Proposal, a written request for withdrawal executed by the Proposer's authorized representative. After the Proposal Due Date, a Proposal may be withdrawn only if the Agency fails to award the Contract within the Proposal validity period prescribed in "Duration of the Validity of Proposals," or any agreed-upon extension thereof. The withdrawal of a Proposal does not prejudice the right of a Proposer to submit another Proposal within the time set for receipt of Proposals.

IP 10.6 Ownership and Cost of Proposal Development

All Proposals will become the property of the Agency.

This RFP does not commit the Agency to enter into a Contract, to pay any costs incurred in the preparation or presentation of a Proposal, nor to procure or contract for the equipment.

IP 11. Proposal Evaluation, Negotiation and Selection

Proposals will be evaluated, negotiated, selected and any award made in accordance with the criteria and procedures described below. The approach and procedures are those applicable to a competitive negotiated procurement whereby Proposals are evaluated to determine which Proposals are within a Competitive Range. Discussions and negotiations may then be carried out with Proposers within the Competitive Range, after which BAFOs may be requested.

However, the Agency may select Proposals for award without any discussions or negotiations or request for any BAFOs. Subject to the Agency's right to reject any or all Proposals, the Proposer whose Proposal is found to be most advantageous to the Agency will be selected, based upon consideration of the criteria of "Proposal Selection Process," below.

IP 11.1 Duration of the Validity of Proposals

Proposals and subsequent offers shall be valid for the period stated in "Section 1: Notice of Request for Proposals." The Agency may request Proposers to extend the period of time specified herein by written agreement between the Agency and the Proposer(s) concerned.

IP 11.2 Evaluation Committee

An Evaluation Committee, which will include officers, employees and agents of the Agency, will be established. The Evaluation Committee will carry out the detailed evaluations, including establishing the Competitive Range, and carrying out negotiations. The Evaluation Committee may report its recommendations and findings to the appropriate Agency individual or body responsible for awarding the Contract. The ultimate decision on the contract award shall be made by PSTA's Board of Directors in its sole and absolute discretion.

IP 11.3 Review of Proposals for Responsiveness and Proposers for Responsibility

Each Proposal will be reviewed to determine if the Proposal is responsive to the submission requirements outlined in this RFP and if the Proposer is responsible.

A responsive Proposal is one that follows the requirements of this RFP, includes all documentation, is submitted in the format outlined in this RFP, is of timely submission, and has the appropriate signatures as required on each document. Failure to comply with these requirements may result in the Proposal being deemed nonresponsive.

A responsible Proposer is one that demonstrates the capability to satisfy the commercial and technical requirements set forth in the Solicitation. A Proposer's failure to demonstrate that it is responsible may result in the Proposal being rejected.

Any Proposal found to be nonresponsive or Proposer found to be non-responsible will not be considered further for award. Proposals that do not comply with the RFP instructions and requirements or do not include the required information may be rejected as insufficient and may not be further considered. The Agency reserves the right to request that a Proposer provide additional information and/or to clarify information. The Agency's determination regarding the responsiveness of a Proposal and the responsibility of a Proposer shall be final.

IP 11.4 Proposal Selection Process

The following describes the process by which Proposals will be evaluated and a selection made for a potential award. Any such selection of a Proposal shall be made by consideration of only the criteria set forth below.

"Qualification Requirements" specifies the requirements for determining responsible Proposers, all of which must be met by a Proposer for it to be found qualified. Final determination of a Proposer's qualification will be made based upon all information received during the evaluation process and as a condition for award.

"Proposal Evaluation Criteria" contains all the evaluation criteria, and their relative order of importance, by which a Proposal from a qualified Proposer will be considered for selection. An award, if made, will be to a responsible Proposer for a Proposal that is found to be in the Agency's best interests, based on price and other evaluation criteria considered. The procedures to be followed for these evaluations are provided in "Evaluation Procedures," below.

Qualification Requirements

The following are the requirements for qualifying responsible Proposers. All of these requirements should be met; therefore, they are not listed in any particular order of importance. Any Proposal that the Evaluation Committee finds does not meet these requirements, and cannot be made to meet these requirements, may be determined by the Evaluation Committee not to be responsible and the Proposal rejected. The requirements are as follows:

1. Sufficient financial strength, resources and capability to finance the Services to be performed and to complete the Contract in a satisfactory manner, as measured by the following:

    - Proposer's financial statements prepared in accordance with generally accepted accounting principles of the jurisdiction in which the Proposer is located, and audited by an independent certified public accountant; oral statement from the Proposer regarding how financial information may be reviewed by the Agency.

    - Proposer's ability to secure financial guarantees, if required, as evidenced by a letter of commitment from an underwriter, surety or other guarantor confirming that the Proposer can provide the required guarantee.

- Proposer's ability to obtain required insurance with coverage values that meet minimum requirements, evidenced by a letter from an underwriter confirming that the Proposer can be insured for the required amount.

2. Evidence that the human and physical resources are sufficient to perform the Contract as specified and to ensure delivery of all equipment within the time specified in the Contract, to include the following:

    - Engineering, management and service organizations with sufficient personnel and requisite disciplines, licenses, skills, experience and equipment to complete the Contract as required and to satisfy any engineering or service problems that may arise during the warranty period.
    - Adequate manufacturing facilities sufficient to produce and factory-test equipment on schedule.
    - A spare parts procurement and distribution system sufficient to support equipment maintenance without delays and a service organization with skills, experience and equipment sufficient to perform all warranty and on-site Work and Services.

3. Evidence that Proposer is qualified in accordance with the provisions of "Section 8: Quality Assurance."

4. Evidence of satisfactory performance and integrity on contracts in making deliveries on time, meeting specifications and warranty provisions, parts availability and steps Proposer took to resolve any judgments, liens, Fleet Defects history or warranty claims. Evidence shall be by client references.

Proposal Evaluation Criteria

The following are the complete criteria, listed in their relative order of importance, by which Proposals from responsible Proposers will be evaluated and ranked for the purposes of determining any Competitive Range and to make any selection of a Proposal for a potential award. Any exceptions, conditions, reservations or understandings explicitly, fully and separately stated on the Form for Proposal Deviation, which do not cause the Agency to consider a Proposal to be outside the Competitive Range, will be evaluated according to the respective evaluation criteria and sub-criteria that they affect.

The criteria are listed numerically by their relative order of importance. However, certain criteria may have sub-criteria identified that are listed by their relative order of importance within the criterion they comprise. Also, certain sub-criteria may have sub-criteria that are listed by their relative degree of importance within the specific sub-criterion they comprise.

A. Evaluation Methodology

The maximum number of points achievable is :

TOTAL POSSIBLE POINTS: 100

B. Technical Evaluation Criteria (maximum of 80 points)

Proposals will be evaluated using the following principal selection criteria:

1. **Product design and performance (0–30 points):** The information provided by the Proposer in its technical submittal relating to the buses to be provided will be utilized to evaluate the Proposal in relation to this factor. Vehicle construction and system design, as well as documented reliability, may be used in this evaluation, as well as other design and performance elements of the components that

comprise those systems. At a minimum, test results, safety and maintenance factors, and cost of normal operation for the bus design and system components proposed, may be considered in determining a final value for this factor.

2. **Proposer's reputation and performance (0–30 points):** The Evaluation Committee will consider the capability and reputation of the Proposer as presented in the Proposal or as is determined by review of information available from references or other resources. The Evaluation Committee may look at the Proposer's overall organizational and financial capabilities and consider key components such as organizational reporting structure, quality control, quality assurance, research and development, technical, training and parts support, response time, product capabilities, ability to furnish multiple bus configurations, bonding capacity, and financial history, as well as other considerations, in reaching a final point determination. The committee may also look at judgments, liens, Fleet Defect history, warranty claims and the steps that the manufacturer took to resolve these concerns in assessing the overall reputation of the manufacturer.
1. **Delivery schedule (0–20 points):** The Evaluation Committee will review the proposed delivery schedule for the Agency's minimum purchase of coaches. Delivery schedules that fulfill the delivery requirements, with evidence that the schedule can be accomplished, may receive higher points for this category.

C. Cost Proposal Evaluation (maximum of 20 points)

As described below, the proposed cost as submitted by the Proposer on the Agency's form will be assigned a maximum of 20 points. The Contractor is *required* to use the Agency's form, without alteration, for submittal of its cost Proposal. *Please DO NOT use your own forms.*

The cost will be evaluated in the following manner:

1. **Cost Proposal Criteria (0–20 points)**

    a. The cost Proposal criteria will be based on the "Total of Both the Low-Floor and Standard Floor Bus," Line 3.C. of Appendix B as noted in Section 8.B.6, "Sum of Total Base Offer per Bus."
    b. The lowest average cost Proposal will receive 20 points. Every other Proposal previously found to be in the Competitive Range will be given points proportionately in relation to the lowest price. This point total will be calculated by dividing the lowest price by the total price of the Proposal being evaluated and the result multiplied by the maximum weight for price (20 points) to arrive at a cost Proposal score.

    Example: Lowest Proposed Price / Proposer's Proposed Price × 20 = Proposal Score

    The application of the above formula will result in a uniform assignment of points relative to the criterion of price.

IP 11.5 Evaluation Procedures

Proposals will be analyzed for conformance with the instructions and requirements of the RFP and Contract Documents. Proposals that do not comply with these instructions and do not include the required information may be rejected as insufficient or not be considered for the Competitive Range. The Agency reserves the right to request that a Proposer provide any missing information and make corrections. Proposers are advised that the detailed evaluation forms and procedures will follow the same Proposal format and organization specified in "Preparation of Proposals." Therefore, Proposers should pay close attention to and strictly follow all instructions. Submittal of a Proposal will signify that the Proposer has accepted the whole of the Contract Documents, except such conditions, exceptions, reservations or understandings explicitly, fully and separately stated on the forms and according to the instructions of the Form for Proposal Deviation. Any such

conditions, exceptions, reservations or understandings that do not result in the rejection of the Proposal are subject to evaluation under the criteria set forth in "Proposal Selection Process."

Evaluations will be made in strict accordance with all the evaluation criteria specified in "Proposal Selection Process," above. The Agency will choose the Proposal that it finds to be most advantageous to the Agency, based upon the evaluation criteria.

IP 11.6 Evaluations of Competitive Proposals

1. **Qualification of responsible Proposers.** Proposals will be evaluated to determine the responsibility of Proposers. A final determination of a Proposer's responsibility will be made upon the basis of initial information submitted in the Proposal, any information submitted upon request by the Agency, information submitted in a BAFO, and information resulting from Agency inquiry of Proposer's references and its own knowledge of the Proposer.

2. **Detailed evaluation of Proposals and determination of Competitive Range.** The Agency will carry out and document its evaluations in accordance with the criteria and procedures set forth in "Proposal Selection Process." Any Proposal deficiencies that may render a Proposal unacceptable will be documented. The Agency will make specific note of questions, issues, concerns and areas requiring clarification by Proposers and to be discussed in any meetings with Proposers that the Agency finds to be within the Competitive Range.

   Rankings of the Proposals against the evaluation will then be made for determining which Proposals are within the Competitive Range, or may reasonably be made to be within the Competitive Range.

3. **Proposals not within the Competitive Range.** Proposers of any Proposals that have been determined by the Agency as not in the Competitive Range, and that cannot be reasonably made to be within the Competitive Range, will be notified in accordance with the Agency's policies.

4. **Discussions with Proposers in the Competitive Range.** The Proposers whose Proposals are found by the Agency to be within the Competitive Range, or that may be reasonably made to be within the Competitive Range, will be notified and any questions or requests for clarifications provided to them in writing. Each such Proposer may be invited for an interview and discussions with the Agency to discuss answers to written or oral questions, clarifications and any facet of its Proposal.

   In the event that a Proposal that has been included in the Competitive Range contains conditions, exceptions, reservations or understandings to any Contract requirements as provided in the Form for Proposal Deviation, said conditions, exceptions, reservations or understandings may be negotiated during these meetings. However, the Agency shall have the right to reject any and all such conditions and exceptions, and instruct the Proposer to amend its Proposal and remove said conditions and exceptions; and any Proposer failing to do so may cause the Agency to find such Proposal to be outside the Competitive Range.

   Proposers will not be given a specific price or specific financial requirements they must meet to gain further consideration, except that proposed prices may be considered to be too high with respect to the marketplace or unacceptable.

5. **Factory and site visits.** The Agency reserves the right to conduct factory visits of the Proposer's facilities and/or the facilities of major sub-suppliers included in the Proposal.

6. **Best and final offers.** After all interviews have been completed, the Proposers in the Competitive Range may be afforded the opportunity to amend their Proposals and make their BAFOs. The Request for BAFOs shall include the following:

   - Notice that discussions and negotiations are concluded.
   - A complete listing of the conditions, exceptions, reservations or understandings that have been approved.
   - A common date and time for submission of written BAFOs, allowing a reasonable opportunity for preparation of the written BAFOs.
   - Notice that if any modification to a BAFO is submitted, it must be received by the date and time specified for the receipt of BAFOs.
   - Notice to Proposers that do not submit a notice of withdrawal or a BAFO that their immediately previous Proposal will be construed as their BAFO.

   Any modification to the initial Proposal made by a Proposer in its BAFO shall be identified in its BAFO. BAFOs will be evaluated by the Agency according to the same requirements and criteria as the initial Proposals ("Proposal Selection Process"). The Agency will make appropriate adjustments to the initial scores for any sub-criteria and criteria that have been affected by any Proposal modifications made by the BAFOs. These final scores and rankings within each criterion will again be arrayed by the Agency and considered according to the relative degrees of importance of the criteria defined in "Proposal Selection Process."

   The Agency will then choose the Proposal that it finds to be most advantageous to the Agency, based upon the evaluation criteria. The results of the evaluations and the selection of a Proposal for any award will be documented.

   The Agency reserves the right to make an award to a Proposer whose Proposal it judges to be most advantageous to the Agency based upon the evaluation criteria, without conducting any written or oral discussions with any Proposers or solicitation of any BAFOs.

7. **Debriefing.** Subsequent to the award, the unsuccessful Proposers will be notified and may request a debriefing. Proposers will be debriefed in accordance with Agency policies, including information regarding the shortcomings of their Proposal.

IP 12. Response to Proposals

IP 12.1 Single Proposal Response

If only one Proposal is received in response to this RFP and it is found by the Agency to be acceptable, then a price or cost analysis, or both, possibly including an audit, may be performed by or for the Agency. The Proposer has agreed to such analysis by submitting a Proposal in response to this RFP.

IP 12.2 Availability of Funds

Funds are not presently available for performance under this Contract beyond the current fiscal year. The Agency's obligation for performance of this Contract beyond the current fiscal year is contingent upon the availability of appropriated funds from which payment for Contract purposes can be made. No legal liability on the part of the Agency for any payment may arise for performance under this Contract beyond the current fiscal year, until the Proposer receives notice of availability of funds, in writing, from the Agency.

IP 12.3 Agency Contract Approval Process

(a) The Agency's Contracting Officer will appoint an Evaluation Committee to review the proposals and make a recommendation for contract award to PSTA's Board of Directors. The proposals will be evaluated by the Evaluation Committee applying the evaluation factor(s) above. The ultimate decision on the contract award shall be made by PSTA's Board of Directors in its sole and absolute discretion.

(b) Proposals may be determined to be "Acceptable", "Potentially Acceptable" (that is, susceptible of being made "Acceptable"), or "Unacceptable". Proposals evaluated as technically "Unacceptable" shall be rejected and will receive no further consideration for award.

(c) The Contracting Officer shall, also, evaluate prices for Proposals determined to be "Acceptable" or "Potentially Acceptable". After completing this evaluation, the Contracting Officer may:

(1) Proceed directly to the PSTA Board of Directors to consider awarding a contract based on the evaluation of initial offers; or

(2) Seek clarifications and/or request the remaining Proposers to make oral presentations concerning their technical Proposals. If oral presentations are required, the Contracting Officer will establish the specific criteria and parameters for oral presentations. Oral presentations shall be used to clarify written Proposals and may be evaluated; and/or

(3) Determine which of the remaining Proposals are within the competitive range and invite the Proposers in the competitive range to participate in discussions. The competitive range will consist of all Proposals that have a reasonable chance of being selected for award. Discussions may address either the technical or price Proposal, or both. At the conclusion of discussions, the Contracting Officer will set a time and date for the submission of "best and final offers." If a Proposer chooses not to submit a best and final offer, its initial Proposal (including price) will be considered its "best and final offer." After the date and time set for receipt of best and final offers the Contracting Officer will evaluate the best and final offers and may present his/her recommendation for award by PSTA's Board of Directors based upon the total points for both the technical and price components of each best and final offer. The ultimate decision on the contract award shall be made by PSTA's Board of Directors in its sole and absolute discretion.

IP 12.4 Agency Rights

The Agency reserves the right to cancel the procurement in whole or in part, at its sole discretion, at any time before the Contract is fully executed and approved on behalf of the Agency.

The Agency reserves the right to reject any or all Proposals, to undertake discussions with one or more Proposers, and to accept that Proposal or modified Proposal which, in its judgment, will be most advantageous to the Agency, considering price and other evaluation criteria. The Agency reserves the right to determine any specific Proposal that is conditional or not prepared in accordance with the instructions and requirements of this RFP to be nonresponsive. The Agency reserves the right to waive any Defects, or minor informalities or irregularities in any Proposal that do not materially affect the Proposal or prejudice other Proposers.

If there is any evidence indicating that two or more Proposers are in collusion to restrict competition or are otherwise engaged in anti-competitive practices, the Proposals of all such Proposers shall be rejected, and

such evidence may be a cause for disqualification of the participants in any future solicitations undertaken by the Agency.

The Agency may reject a Proposal that includes unacceptable Deviations as provided in the Form for Proposal Deviation.

IP 12.5 Execution of Contract

The acceptance of a Proposal for award, if made, shall be evidenced in writing by a notice of award of Contract delivered to the Proposer whose Proposal is accepted. Upon notice of award of the Contract to a Proposer, the Proposer shall commence performance under the Contract by furnishing any required bonds, and by furnishing copies of the certificates of insurance required to be procured by the Contractor pursuant to the Contract Documents within 30 calendar days after the date of receipt of the notice of award. Failure to fulfill these requirements within the specified time is cause for termination of the Contract under "Termination for Default" in Section 3.

IP 13. Conflicts of Interests and Gratuities

Proposers are prohibited from engaging in any practice that may be considered a conflict of interest under existing Agency policies and/or state law, and to refrain from participating in any gifts, favors or other forms of compensation that may be viewed as a gratuity in accordance with existing policies and laws.

Proposer warrants that it has not offered or given gratuities (in the form of entertainment, gifts, or otherwise) to any official or employee of PSTA with a view toward securing favorable treatment in the awarding, amending, or evaluating Proposer's performance under this Contract.

No member of or delegate to the Congress of the United States shall be admitted to any share or part of this Contract or to receive any benefit there from. Contractor represents and warrants that no public officers or procurement employees have a material ownership interest in Contractor and this Contract is not otherwise prohibited by part III, chapter 112, Florida Statutes. Contractor further represents and warrants that its current business dealings will not conflict in any manner with Contractor's performance of the Services. Contractor shall promptly notify PSTA of any potential conflicts of interest which may arise throughout this Contract with respect to any prospective business association, interest or other circumstance with may influence, or appear to influence, the Contractor's judgment or quality of the Services. Such written notification shall identify the prospective business association, interest or circumstance, the nature of work that the Contractor may undertake and request an opinion of PSTA as to whether the association, interest or circumstance would, in the opinion of PSTA, constitute a conflict of interest if entered into by the Contractor. PSTA agrees to notify Contractor of its decision within thirty (30) days of receipt of notification by Contractor. If, in the opinion of PSTA, the prospective business association, interest or circumstance would not constitute a conflict of interest, PSTA shall so state in the notification and Contractor shall, at its option, enter into said association, interest or circumstance and it shall be deemed not in conflict of interest with respect to the Services.

IP 14. Ordering Instructions

Each Procuring Agency will forward to PSTA the executed purchase order for the buses being purchased. Each purchase order will contain the pricing for any and all optional equipment and or accessories listed in the Contractor's proposal. The Contractor will promptly assign each order a tracking and control number and forward a copy of the request and purchase order to the Florida Transit Association Finance Corporation

(FTAFC) for processing and invoicing of transaction fees ($500 per bus, not to exceed $10,000 per calendar year per Procuring Agency).

NOTE: Transaction Fee will be paid directly from Procuring Agency to FTAFC.

SECTION 3: GENERAL CONDITIONS

Definitions, Abbreviation, and Acronyms

GC 1.

The following are definitions of special terms used in this document:

Agency: Pinellas Suncoast Transit Authority (PSTA)

Authorized Signer: The person who is executing this Contract on behalf of the Contractor and who is authorized to bind the Contractor.

Best and Final Offer (BAFO): The last Proposal made by a Proposer. If a BAFO is not specifically requested by the Agency, or if the Proposer does not promptly respond to a request for a BAFO, then the most recent, current Proposal is the BAFO.

Competitive Range: The range of Proposals that are identified as the most highly rated, unless the range is further reduced for purposes of efficiency.

Contract: The Proposal and its acceptance by the Agency as manifested by the Contract Documents specified in "Section 10: Contract."

Contracting Officer: The person who is executing this Contract on behalf of the Agency and who has complete and final authority except as limited herein.

Contractor: The successful Proposer who is awarded a Contract for providing all buses and equipment described in the Contract Documents.

Contract Sum: The maximum amount approved by PSTA's Board of Directors for this Contract.

Contract Time: The maximum amount of time for all Services to be fully and finally, completed, delivered, inspected and accepted by PSTA.

Days: Calendar days, unless otherwise stated.

Defect: Patent or latent malfunction or failure in manufacture, installation or design of any component or subsystem.

Deviation: Variance from a requirement or specification that does not alter the basis of a Contract or adversely affects its performance.

Due Date: The date and time by which Proposals must be received by the Agency as specified in "Section 1: Notice of Request for Proposals."

Extended Warranty: A warranty available for purchase above the standard warranty.

Pass-Through Warranty: A warranty provided by the Contractor but administered directly with the component Supplier.

Proposal: A promise, if accepted, to deliver equipment and services according to the underlying solicitation of the Agency documented using the prescribed form in the solicitation, including any Proposal or BAFO.

Proposer: A legal entity that makes a Proposal.

Services: The manufacture and delivery of the Electric Transit Buses with charging stations and associated equipment procured by this Solicitation.

Related Defect: Damage inflicted on any component or subsystem as a direct result of a separate Defect.

Solicitation: The Agency's request for proposals # 21-980369.

Superior Warranty: A warranty still in effect after all contractually required warranties have expired. The remaining warranty is administered directly between the Sub-Supplier and the Agency.

Supplier: Any manufacturer, company or Agency providing units, components or subassemblies for inclusion in the buses and charging and associated equipment that are installed by the Contractor. Supplier items shall require qualification by type and acceptance tests in accordance with requirements defined in "Section 8: Quality Assurance."

Subcontractor: Any manufacturer, company or Agency providing units, components or subassemblies for inclusion in the bus that are installed by a Subcontractor. Subcontractor items shall require qualification by type and acceptance tests in accordance with requirements defined in "Section 8: Quality Assurance."

Work: Any and all labor, supervision, services, materials, machinery, equipment, tools, supplies and facilities called for by the Contract and necessary to the completion thereof.

A/C	air conditioning
ABS	antilock braking system
AC	alternating current
ACQ	alkaline copper quaternary
ADA	Americans with Disabilities Act
ADB	advanced design bus
Ah	amp hour
ALR	auto-locking retractor
APA	The Engineered Wood Association, formerly the American Plywood Association
APC	automatic passenger counter
APTA	American Public Transportation Association
ASTM	ASTM International, formerly the American Society for Testing and Materials
ATC	automatic traction control
AVL	automatic vehicle location
AWG	American Wire Gauge
BAFO	Best and Final Offer
BMS	Battery Management System
BRT	bus rapid transit
CARB	California Air Resources Board
CCS	climate control system
CCTV	closed-circuit television
cfm	cubic feet per minute

dB	decibel
DBE	disadvantaged business enterprise
DC	direct current
DDU	driver display unit
DOT	Department of Transportation
EDR	event data recorder
ECM	Electric Control Module
ELR	emergency locking retractor
EMI	electromagnetic interference
EPA	Environmental Protection Agency
EOL	end of life
ESS	energy storage system
EVSE	electric vehicle supply equipment
fc	foot-candle
FEA	Finite Element Analysis
FEMA	failure mode effects analysis
FMCSA	Federal Motor Carrier Safety Administration
FMVSS	Federal Motor Vehicle Safety Standards
FTA	Federal Transit Administration
GAWR	gross axle weight rated
GPS	global positioning system
GVW	gross vehicle weight
GVWR	gross vehicle weight rated
H-point	hip-point
HDS	hybrid drive system
HMI	human-machine interface
HSC	hybrid system controller
HV	high voltage
HVAC	heating, ventilation and air conditioning
I/O	input/output
IEEE	Institute of Electrical and Electronics Engineers
inHg	inches of mercury
ISO	International Standards Organization
kJ	kilojoule
LEL	LED emergency light
LV	low voltage
mA	milliampere
MDT	mobile data terminal
MPa	mega-Pascal
NC	normally closed
NFPA	National Fire Protection Association
NO	normally open
NTP	notice to proceed
OEM	original equipment manufacturer
OSI	Open Systems Interconnect
PA	public address
PMO	project management oversight
PPV	price per vehicle
psi	pounds per square inch
RF	radio frequency

RFI	radio frequency interference
RTC	real-time clock
SAE	SAE International, formerly the Society of Automotive Engineers
scf	standard cubic feet
SLW	seated load weight
SoC	state of charge
UL	Underwriters Laboratories
UNECE	United Nations Economic Commission for Europe
UPS	uninterruptable power supply
USC	United States Code
USCA	United States Code Annotated
V DC	volts of direct current
WEOL	warrantable end of life
Wh	watt-hours
VIN	vehicle information number
ZEV	zero-emission vehicle

GC 2. Materials and Workmanship

The Contractor shall be responsible for all materials and workmanship in the construction of the buses and all accessories used, and the charging and associated equipment, whether the same are manufactured by the Contractor or purchased from a Supplier. Contractor shall cause the Services to be completed in a workmanlike manner and shall provide services of first quality. All work and workmanship associated with the Services must be in accordance with customary standards of the various trades and industries involved in the Services. Contractor shall enforce strict discipline and good order among its employees, subcontractors, representatives, agents, and any others carrying out the Services. Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the work on the Services.

GC 3. Conformance with Specifications and Drawings

Materials furnished and Services performed by the Contractor shall conform to the requirements of the Technical Specifications and other Contract Documents. Notwithstanding the provision of drawings, technical specifications or other data by the Agency, the Contractor shall have the responsibility of supplying all parts and details required to make the buses with charging and associated equipment complete and ready for service even though such details may not be specifically mentioned in the drawings and specifications. Items that are installed by the Agency shall not be the responsibility of the Contractor unless they are included in this Contract.

The Services and all work associated therewith shall be of high-quality in all respects. No advantage will be taken by the Contractor in the omission of any part or detail of the Services. Contractor hereby assumes responsibility for all materials, equipment, and processes used in the Services, whether the same is manufactured by Contractor or purchased readymade from an outside source. Omissions from the Technical Specifications, or the inaccurate description of details of Work or Services that are manifestly necessary to carry out the intent of the Technical Specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted Services or Work or inaccurately described details of the Services or Work, and they shall be performed as if fully and correctly set forth and described.

GC 4. Inspection, Testing and Acceptance

GC 4.1 General

The Agency's Representative shall at all times have access to the Services and Work, the Contractor and, through the Contractor, its Suppliers. The Contractor and its Suppliers shall furnish every reasonable facility for ascertaining that the materials and the workmanship are in accordance with the requirements of the Contract Documents. All Services and Work done shall be subject to the Agency Representative's inspection and approval in accordance with the approved Services and Work products developed as a result of the Contract Documents.

The pre-delivery tests and inspections shall be performed at the Contractor's plant; they shall be performed in accordance with the procedures defined in "Section 8: Quality Assurance"; and they may be witnessed by the resident inspector. When a bus passes these tests and inspections, the resident inspector shall authorize release of the bus.

Within fifteen (15) calendar days after arrival at the designated point of delivery, the bus shall undergo the Agency tests defined in "Post-Delivery Tests." If the bus passes these tests or if the Agency does not notify the Contractor of non-acceptance within 15 calendar days after delivery, then acceptance of the bus by the Agency occurs on the 15th day after delivery. If the bus fails these tests, it shall not be accepted until the repair procedures defined in "Repairs after Non-Acceptance" have been carried out and the bus retested until it passes. Acceptance occurs earlier if the Agency notifies the Contractor of early acceptance or places the bus in revenue service.

GC 4.2 Risk of Loss

The Contractor shall assume risk of loss of buses delivered under SP 2.1, Bus Delivery of this Contract. Prior to this delivery, the Contractor shall have risk of loss of all buses delivered under this Contract, including any damages sustained during the delivery regardless of the status of title or any payments related to the bus. Drivers shall keep a maintenance log enroute, and it shall be delivered to the Agency with the delivery of each bus. If the bus is released back to the Contractor for any reason, then the Contractor has the risk of loss upon such release. All other deliverables under this Contract not specified herein shall be free on board destination.

GC 5. Title and Warranty of Title

Adequate documents for registering title for each of the buses delivered under this Contract in Pinellas County Florida shall be provided to the Agency not fewer than ten (10) business days before delivery to the Agency. Upon acceptance of each bus, the Contractor warrants that the title shall pass to the Agency free and clear of any and all encumbrances.

GC 6. Intellectual Property Warranty

The Contractor warrants that the Services, and all work, goods and services associated therewith do not infringe on any patent, trademark, copyright or trade secret of any third parties and agrees to defend, indemnify and hold harmless PSTA, its officers, agents, employees, trustees and its successors and assigns, from and against any and all liabilities, loss, damage or expense, including, without limitation, court costs and reasonable attorneys' fees, arising out of any infringement or claims of infringement of any patent, trade name, trademark, copyright or trade secret by reason of the sale or use of any goods or services purchased under the Contract. PSTA shall promptly notify the Contractor of any such claim. PSTA makes no warranty that the production, sale or use of goods or services under the Contract will not give rise to any such claim and PSTA shall not be liable to the Contractor for any such claim brought against the Contractor.

GC 7. Data Rights

GC 7.1 Proprietary Rights/Rights in Data

The term "subject data" used in this clause means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the Contract. It includes the proprietary rights of the following:

- Shop drawings and working drawings
- Technical data including manuals or instruction materials, computer or microprocessor software
- Patented materials, equipment, devices or processes
- License requirements

All subject data that constitutes a "trade secret" of the Contractor, as defined in section 812.081, Florida Statutes, shall be clearly marked by the Contractor at the time of delivery to PSTA. The Contractor shall grant a non-exclusive license to allow PSTA to utilize such information in order to maintain the buses and/or charging stations and associated equipment. If the Contractor fails to provide such license, PSTA shall have the right to reverse engineer the subject data, including but not limited to patented parts and software.

The Agency reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, the following subject data for its purposes: (1) any subject data required to be developed and first produced in the performance of the Contract and specifically paid for as such under the Contract, whether or not a copyright has been obtained; and (2) any rights of copyright to which the Contractor, Subcontractor or Supplier purchases ownership for the purpose of performance of the Contract and specifically paid for as such under the Contract. The Contractor agrees to include the requirements of this clause, modified as necessary to identify the affected parties, in each subcontract and supply order placed under the Contract.

GC 7.2 Access to Onboard Operational Data

The Agency grants to the Contractor the right to inspect, examine, download and otherwise obtain any information or data available from components provided by the Contractor, including but not limited to any electronic control modules or other data-collection devices, to the extent necessary to enable the Contractor to perform reliability maintenance analysis, corrective action and/or other Work or Services under this Contract. This right expressly excludes access to information or data collected on any equipment not provided and installed by the Contractor.

GC 8. Changes

GC 8.1 Contractor Changes

Any proposed change in this Contract shall be submitted to the Agency for its prior approval. Oral change orders are not permitted. No change in this Contract shall be made without the prior written approval of the Contracting Officer. The Contractor shall be liable for all costs resulting from, and/or for satisfactorily correcting, any specification change not properly agreed to by written modification to the Contract and signed by the Contracting Officer.

GC 8.2 Agency Changes

The Agency may obtain changes to the Contract by notifying the Contractor in writing. As soon as reasonably possible but no later than thirty (30) calendar days after receipt of the written change order to modify the Contract, the Contractor shall submit to the Contracting Officer a detailed price and schedule Proposal for the Work or Services to be performed. This Proposal shall be accepted or modified by negotiations between the Contractor and the Contracting Officer. At that time, a detailed modification shall be executed in writing by both parties. Disagreements that cannot be resolved within negotiations shall be resolved in accordance with

"Disputes," below. Regardless of any disputes, the Contractor shall proceed with the Work or Services ordered.

GC 8.3 No Stoppage of Work or Increase in Costs

Notwithstanding the foregoing, nothing in this section GC 8 shall excuse the Contractor from proceeding with the Work or Services as changed except for those changes which would increase the Contract Sum. No Work or Services for which an additional cost or fee will be charged by the Contractor shall be performed without the prior express written authorization of PSTA. Any increase in costs which would serve to increase the Contract Sum must be approved by PSTA's Board of Directors before such costs are incurred.

GC 9. Legal Clauses

GC 9.1 Indemnification

The following indemnification clause shall apply to all Work or Services related to the manufacture and delivery of Electric Transit Buses with charging and associated equipment.. To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless PSTA, its elected officials, officers and employees, from any and all liabilities, any and all claims including claims for equitable or injunctive relief, damages, losses and costs, including but not limited to reasonable attorney's fees, to the extent caused by the negligence, recklessness, or intentionally wrongful conduct of the Contractor, its employees, agents, officers, subcontractors, Suppliers, sub-suppliers and other persons employed or utilized by the Contractor in the performance of the Contract. This indemnification obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any part or person described in this section, including but not limited to any immunity from or limitation of liability to which PSTA is entitled to pursuant to the doctrine of sovereign immunity or section 768.28, Florida Statutes. This indemnification provision shall include claims made by an employee of the Contractor against PSTA and the Contractor waives any entitlement to immunity under section 440.11, Florida Statutes. This indemnification provision shall survive the termination of the Contract however terminated, and shall not be limited by the amount of any insurance required to be obtained or maintained under the Contract Documents.

The Parties recognize that Contractor is an independent contractor. Contractor agrees to assume liability for and indemnify, hold harmless, and defend PSTA, its board members, officers, employees, agents and attorneys of, from, and against all liability and expense, including reasonable attorneys' fees, in connection with any and all claims, demands, damages, actions, causes of action, and suits in equity of whatever kind or nature, including claims for personal injury, property damage, equitable relief, loss of use, or Contractor's violation or alleged violation of any third parties' trade secrets, proprietary information, trademark, copyright, patent rights or first amendment rights arising out of the execution, performance, nonperformance, or enforcement of this Contract, whether or not due to or caused by the negligence of PSTA, its board members, officers, employees, agents, and/or attorneys excluding only the sole negligence of PSTA, its officers, employees, agents, and attorneys. Contractor's liability hereunder shall include all attorneys' fees and costs incurred by PSTA in the enforcement of this indemnification provision. This includes claims made by the employees of Contractor against PSTA, and Contractor hereby waives its entitlement, if any, to immunity under Section 440.11, Florida Statutes. Notwithstanding anything contained herein to the contrary, this indemnification provision shall not be construed as a waiver of any immunity from or limitation of liability to which PSTA is entitled to pursuant to the doctrine of sovereign immunity or Section 768.28, Florida Statutes. All obligations contained in this Section 10 shall survive termination of this Contract, however terminated, and shall not be limited by the amount of any insurance required to be obtained or maintained under the Contract Documents.

Subject to the limitations set forth in this Section, Contractor shall assume control of the defense of any claim asserted by a third party against PSTA arising from or in any way related to this Contract and, in connection with such defenses, shall appoint lead counsel, in each case at Contractor's expense. Contractor shall have the right, at its option, to participate in the defense of any third party claim, without relieving Contractor of any of its obligations hereunder. If Contractor assumes control of the defense of any third party claim in accordance with this paragraph, Contractor shall obtain the prior written consent of PSTA before entering into any settlement of such claim. Notwithstanding anything to the contrary in this provision, Contractor shall not assume or maintain control of the defense of any third party claim, but shall pay the fees of counsel retained by PSTA and all expenses including experts' fees, if (i) an adverse determination with respect to the third party claim would, in the good faith judgment of PSTA, be detrimental in any material respect of PSTA's reputation; (ii) the third party claim seeks an injunction or equitable relief against PSTA; or (iii) Contractor has failed or is failing to prosecute or defend vigorously the third party claim. Each party shall cooperate, and cause its agents to cooperate, in the defense or prosecution of any third party claim and shall furnish or cause to be furnished records and information, and shall attend any conferences, discovery proceedings, hearings, trials, or appeals, as may be reasonably requested in connection therewith.

GC 9.2 Suspension of Work or Services

GC 9.2.1 The Agency may at any time and for any reason within its sole discretion issue a written order to the Contractor suspending, delaying or interrupting all or any part of the Work or Services for a specified period of time. If such suspension would cause any delay in performance, any increase in the Contract Sum, and/or increase in the Contract Time, the Contractor shall provide notice to PSTA.

GC 9.2.2 The Contractor shall comply immediately with any such written order and take all reasonable steps to minimize costs allocable to the Work or Services covered by the suspension during the period of work stoppage. Contractor shall continue the Work or Services that is not included in the suspension and shall continue such ancillary activities as are not suspended. The Contractor shall resume performance of the suspended Work or Services upon expiration of the notice of suspension, or upon direction from the Agency.

GC 9.2.3 The Contractor shall be allowed an equitable adjustment in the Contract price (excluding profit) and/or an extension of the Contract time, to the extent that cost or delays are shown by the Contractor to be directly attributable to any suspension. However, no adjustment shall be made under this section for any suspension, delay or interruption due to the fault or negligence of the Contractor, or for which an equitable adjustment is provided for, or excluded under any other term or condition of the Contract. As soon as reasonably possible but no later than forty-five (45) calendar days, or any other period of time agreed to by the parties, after receipt of the written suspension of work notice, the Contractor shall submit to the Contracting Officer a detailed price and schedule Proposal for the suspension, delay or interruption.

GC 9.3 Excusable Delays/Force Majeure

GC 9.3.1 If the Contractor is delayed at any time during the progress of the Work by the neglect or failure of the Agency or by a cause as described below, then the time for completion and/or affected delivery date(s) may be extended by the Agency subject to the following cumulative conditions:

a. The cause of the delay arises after the Notice of Award and neither was nor could have been anticipated by the Contractor by reasonable investigation before such award. Such cause may also include force majeure events such as any event or circumstance beyond the reasonable control of the Contractor, including but not limited to acts of God; earthquake, flood and any other natural disaster; civil disturbance, strikes and labor disputes; fires and explosions; war and other hostilities; embargo;

or failure of third parties, including Suppliers or Subcontractors, to perform their obligations to the Contractor;

b. The Contractor demonstrates that the completion of the Work and Services and/or any affected deliveries will be actually and necessarily delayed;
c. The Contractor has taken measures to avoid and/or mitigate the delay by the exercise of all reasonable precautions, efforts and measures, whether before or after the occurrence of the cause of delay; and
d. The Contractor makes written request and provides other information to the Agency as described in paragraph GC 9.3.4 below.

A delay in meeting all the conditions of this section shall be deemed an excusable delay. Any concurrent delay that does not constitute an excusable delay shall not be the sole basis for denying a request hereunder.

GC 9.3.2 None of the above shall relieve the Contractor of any liability for the payment of any liquidated damages owing from a failure to complete the Work and Services by the time for completion that the Contractor is required to pay pursuant to "Liquidated Damages for Late Delivery of the Bus" for delays occurring prior to, or subsequent to the occurrence of an excusable delay.

GC 9.3.3 The Agency reserves the right to rescind or shorten any extension previously granted, if subsequently the Agency determines that any information provided by the Contractor in support of a request for an extension of time was erroneous; provided, however, that such information or facts, if known, would have resulted in a denial of the request for an excusable delay. Notwithstanding the above, the Agency will not rescind or shorten any extension previously granted if the Contractor acted in reliance upon the granting of such extension and such extension was based on information that, although later found to have been erroneous, was submitted in good faith by the Contractor.

GC 9.3.4 No extension or adjustment of time shall be granted unless: (1) written notice of the delay is filed with the Agency within fourteen (14) calendar days after the commencement of the delay and (2) a written application therefore, stating in reasonable detail the causes, the effect to date and the probable future effect on the performance of the Contractor under the Contract, and the portion or portions of the Work or Services affected, is filed by the Contractor with the Agency within thirty (30) calendar days after the commencement of the delay. No such extension or adjustment shall be deemed a waiver of the rights of either party under this Contract. The Agency shall make its determination within thirty (30) calendar days after receipt of the application.

GC 9.4 Termination

This Contract may be terminated with or without cause in accordance with the provisions below.

GC 9.4.1 Termination for Convenience

Without Cause. For and in consideration of $10.00, if PSTA determines that it is in its best interest to do so, PSTA may terminate this Contract without cause, and without penalty or expense to PSTA, upon thirty (30) days' written notice to Contractor. If PSTA terminates this Contract pursuant to this subsection, Contractor shall promptly submit to PSTA its costs to be paid for Work or Services performed in accordance with the Contract Documents, up to the date of termination. If Contractor has any property belonging to PSTA in its

possession, Contractor shall account for the same and dispose of it or delivery it to PSTA, as directed by PSTA.

After receipt of a notice of termination, and except as otherwise directed by the Contracting Officer, the Contractor shall do the following:

- Stop Work or Services under the Contract on the date and to the extent specified in the notice of termination.
- Place no further orders to Suppliers or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the Work under the Contract as is not terminated.
- Terminate all orders and subcontracts to the extent that they relate to the performance of Work terminated by the notice of termination; assign to the Agency in the manner, at the times, and to the extent directed by the Contracting Officer, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the Agency shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.
- Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Contracting Officer, to the extent he or she may require, which approval or ratification shall be final for all the purposes of this clause.
- Transfer title to the Agency and deliver in the manner, at the times and to the extent, if any, directed by the Contracting Officer the fabricated or unfabricated parts, Work in process, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated, and the completed or partially completed plans, drawings, information and other property which, if the Contract had been completed, would have been required to be furnished to the Agency.
- Use its best efforts to sell, in the manner, at the times, to the extent, and at the price(s) directed or authorized by the Contracting Officer, any property of the types referred to above, provided, however, that the Contractor shall not be required to extend credit to any purchaser, and may acquire any such property under the conditions prescribed by and at prices approved by the Contracting Officer, and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Agency to the Contractor under this Contract or shall otherwise be credited to the price or cost of the Work covered by this Contract or paid in such other manner as the Contracting Officer may direct.
- Complete performance of such part of the Work as shall not have been terminated by the notice of termination.
- Take such action as may be necessary, or as the Contracting Officer may direct, for the protection or preservation of the property related to this Contract that is in the possession of the Contractor and in which the Agency has or may acquire an interest.

The Contractor shall be paid its costs, including Contract closeout costs, and profit on Work performed in accordance with the Contract Documents, up to the time of the notice of termination. The Contractor shall promptly submit its termination claim to the Agency to be paid the Contractor. Settlement of claims by the Contractor under this termination for convenience clause shall be in accordance with the provisions set forth in Part 49 of the Federal Acquisition Regulations (48 CFR 49) except that wherever the word “Government” appears, it shall be deleted and the word “Agency” shall be substituted in lieu thereof.

Waiver of Incidental Damages. Notwithstanding anything contained herein, in no event shall the Contractor be entitled to receive termination expenses, unabsorbed overhead, lost profit, or any other consequential, special, or incidental damages, all of which are hereby expressly waived by the Contractor.

GC 9.4.2 Termination for Default

The Agency may terminate this Contract with cause at any time immediately upon written notice to the Contractor, if: (1) the Contractor fails to fulfill or abide by any of the terms or conditions specified in the Contract Documents; (2) the Contractor fails to perform in the manner called for in the Contract Documents; or (3) the Contractor does not provide the Services or the Work in accordance with the requirements of the specifications in the Contract Documents. In its sole discretion, PSTA may allow the Contractor an appropriately short period of time in which to cure a defect in performance or non-performance. In such case, PSTA's written notice of termination to the Contractor shall state the time period in which cure is permitted and other appropriate conditions, if applicable. The Contractor may terminate the Contract for cause if PSTA fails to fulfill or abide by any duties or conditions specified in the Contract Documents, provided that the Contractor must first provide notice of the alleged breach to PSTA and give PSTA ninety (90) days' written notice to cure the alleged breach. If PSTA cures the alleged breach or is making a good faith effort to cure said breach during the ninety (90) day cure period, the Contractor may not terminate the Contract. Should the Contract be terminated by PSTA for cause under this section, the Contractor shall be liable for all expenses incurred by PSTA in re-procuring elsewhere the same or similar items or services offered by the Contractor. If it is later determined by PSTA that Contractor's failure to perform was a result of a Force Majeure, PSTA may allow the Contractor to continue performance under a new time for performance under section 9.3.1 or treat the termination as if terminated without cause under section 9.4.1 of the Contract.

If the Contract is terminated in whole or in part for default, the Agency may procure, upon such terms and in such manner as the Contracting Officer may deem appropriate, supplies or services similar to those so terminated. The Contractor shall be liable to the Agency for any excess costs for such similar supplies or services and shall continue the performance of this Contract to the extent not terminated under the provisions of this clause.

Except with respect to defaults of Subcontractors, the Contractor shall not be liable for any excess costs if the failure to perform the Contract arises out of a cause beyond the control and without the fault or negligence of the Contractor. If the failure to perform is caused by the default of a Subcontractor, and if such default arises out of causes beyond the control of both the Contractor and Subcontractor, and without the fault or negligence of either of them, then the Contractor shall not be liable for any excess costs for failure to perform, unless the supplies or services to be furnished by the Subcontractor were obtainable from other sources and in sufficient time to permit the Contractor to meet the required delivery schedule.

Payment for completed Services delivered to and accepted by the Agency shall be at the Contract price. The Agency may withhold from amounts otherwise due the Contractor for such completed Services such sum as the Contracting Officer determines to be necessary to protect the Agency against loss because of outstanding liens or claims of former lienholders.

GC 9.5 Compliance with Laws and Regulations

The Contractor shall at all times comply with all federal, state, county, and local laws, rules and/or regulations, and lawful orders of public authorities including those set forth in the Contract Documents and that, in any manner, could bear on the Services and the Contractor's Work under the Contract (together, the "Law"), including without limitation FTA regulations, policies, procedures and directives, including those listed directly or by reference in the agreement between the Agency and FTA that funds any part of this

Contract, as they may be amended or promulgated from time to time during the term of this Contract. Contractor's failure to so comply shall constitute a material breach of this Contract.

GC 9.6 Changes of Law

Changes of Law that become effective after the Proposal due date may result in price changes. If a price adjustment is indicated, either upward or downward, it shall be negotiated between the Agency and the Contractor, and the final Contract price will be adjusted upward or downward to reflect such changes in Law. Such price adjustment may be audited, where required.

GC 9.7 Governing Law and Choice of Forum

The Contract Documents shall be governed by, construed and interpreted in accordance with the laws of the State of Florida. Contractor and PSTA consent to jurisdiction over them and agree that venue for any state action shall lie solely in the Sixth Judicial Circuit in and for Pinellas County, Florida, and for any federal actions shall lie solely in the U.S. District Court, Middle District of Florida, Tampa Division.

GC 9.8 Disputes and Claims

(a) Claims and Disputes Authority to Resolve. All claims or disputes by the Contractor against the Agency relating to the Contract shall be submitted in writing to the designated Contracting Officer for a determination in accordance with this Section.

(b) Definition. Claims and disputes include controversies raised by the Contractor arising under the Contract and those based upon breach of contract, mistake, misrepresentation or other cause of contract modification, termination or rescission.

(c) Notice of Claim or Dispute. The Contractor shall submit a Notice of Claim or Dispute to PSTA in writing within ten (10) days of issue giving rise to claim or dispute. The date of the issue shall include when the contractor knew of the issue or should have known of the issue that gave rise to the claim or dispute.

(d) Notice Requirements. The Notice of Claim or Dispute shall include at a minimum:

(1) the Notice of Claim or Dispute shall be titled "Notice of Contract Claim or Notice of Contract Dispute";

(2) name and address of the Contractor;

(3) name of the attorney and firm representing Contractor, if applicable;

(4) identification of the Contract; and

(5) reasons for the claim or dispute.

(e) Failure to timely submit Notice. Failure to submit the Notice of Claim or Dispute within ten (10) days of the issue that gave rise to the dispute or claim will result in the claim or dispute being rejected by the Agency without further consideration. The date of the issue shall include when the Contractor knew of the issue or should have known of the issue that gave rise to the claim or dispute.

(f) Delivery. A Notice of Claim or Dispute shall be sent via hand delivery or certified mail. **Electronic forms of delivery are not an acceptable means of delivery.** The Contractor is solely responsible for verifying that

the Notice of Claim or Dispute was received in a timely manner. Notice of Claim or Dispute should be addressed to:

Pinellas Suncoast Transit Authority
Attention: Chief Executive Officer
3201 Scherer Drive
St. Petersburg, Florida 33716

(g) Timeline for Formal Written Claim or Dispute. The Formal Written Claim or Dispute shall be filed within seven (7) days after the date the Notice of Claim or Dispute is timely filed. Failure to submit the Formal Written Claim or Dispute within seven (7) days will result in the Claim or Dispute being rejected by the Agency without further consideration.

(h) Written Claim or Dispute Requirements. The Formal Written Claim or Dispute shall include at a minimum:
(1) the Formal Written Claim or Dispute shall be titled "Formal Written Contract Claim or Dispute";

(2) name and address of the Contractor;

(3) name of the attorney and firm representing Contractor, if any;

(4) identification of the Solicitation;

(5) reason(s) for the claim or dispute;

(6) requested relief;

(7) the claim or dispute must demonstrate how the Contractor has been aggrieved as a result of the Agency's decision and shall include the facts, argument(s), and the law upon which the claim or dispute is made;

(8) documents to substantiate the basis or ground for the claim or dispute.

(i) No further consideration. Any documents, basis or ground(s) for the claim or dispute not set forth or provided in the formal written contract claim or dispute required under this provision shall be deemed waived.

(j) Written determination. The Contracting Officer shall issue a decision in writing within ten (10) days of the hearing of Claim or Dispute and shall mail to the Contractor. The decision shall state the reasons for the decision reached.

(k) Administrative Remedies. This process is considered to be an administrative remedy and all Contractors agree to exhaust their administrative remedies under the Agency policies prior to seeking judicial relief of any type in connection with any matter related to the suspension or debarment.

(l) Continue with Work and Services. Unless otherwise directed by PSTA, Contractor shall continue performance under the Contract while matters in dispute are being resolved, unless the continuation of performing will cause additional claims for additional compensation on the same grounds set forth in the claim provided to PSTA.

GC 9.9 Maintenance of Records; Access by Agency; Right to Audit Records

In accordance with 49 CFR § 18.36(i), 49 CFR § 19.48(d) and 49 USC § 5325(a), provided that PSTA is the FTA recipient or a sub-grantee of the FTA recipient, the Contractor agrees to provide PSTA, FTA, the Comptroller General of the United States, the Secretary of the U.S. Department of Transportation, the State of Florida or any of their duly authorized representatives access to any books, documents, papers and records of the Contractor that are directly pertinent to or relate to this Contract (1) for the purpose of making audits, examinations, excerpts and transcriptions and (2) when conducting an audit and inspection.

1. In the event of a sole-source Contract, single Proposal, single responsive Proposal, or competitive negotiated procurement, the Contractor shall maintain and the Contracting Officer, the U.S. Department of Transportation (if applicable) or the representatives thereof shall have the right to examine all books, records, documents and other cost and pricing data related to the Contract price, unless such pricing is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the public, or prices set by law or regulation, or combinations thereof. Data related to the negotiation or performance of the Contract shall be made available for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data. The right of examination shall extend to all documents necessary for adequate evaluation of the cost or pricing data, along with the computations and projections used therein, including review of accounting principles and practices that properly reflect all direct and indirect costs anticipated for the performance of the Contract.

2. For Contract modifications or change orders, the Contracting Officer, the U.S. Department of Transportation, if applicable, or their representatives shall have the right to examine all books, records, documents and other cost and pricing data related to a Contract modification, unless such pricing is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the public, or prices set by law or regulation, or combinations thereof. Data related to the negotiation or performance of the Contract modification or change order shall be made available for the purpose of evaluating the accuracy, completeness and currency of the cost or pricing data. The right of examination shall extend to all documents necessary for adequate evaluation of the cost or pricing data, along with the computations and projections used therein, either before or after execution of the Contract modification or change order for the purpose of conducting a cost analysis. If an examination made after execution of the Contract modification or change order reveals inaccurate, incomplete or out-of-date data, the Contracting Officer may renegotiate the Contract modification or change order price adjustment, and the Agency shall be entitled to any reductions in the price that would result from the application of accurate, complete or up-to-date data.

   The requirements of this section are in addition to other audit, inspection and record-keeping provisions specified elsewhere in the Contract documents.

   NOTE: FTA does not require Contractors to flow down these requirements to Subcontractors.

GC 9.10 Public Records

Pursuant to section 119.0701, Florida Statutes, for any tasks performed by the Contractor on behalf of PSTA, the Contractor shall: (a) keep and maintain all public records, as that term is defined in chapter 119, Florida Statutes (“Public Records”), required by PSTA to perform the Cork contemplated by the Contract; (b) upon request from PSTA’s custodian of public records, provide PSTA with a copy of the requested Public Records

or allow the Public Records to be inspected or copied within a reasonable time at a cost that does not exceed the costs provided in chapter 119, Florida Statutes, or as otherwise provided by law; (c) ensure that Public Records that are exempt or confidential and exempt from Public Records disclosure requirements are not disclosed except as authorized by law for the duration of the term of the Contract and following completion or termination of the Contract, if the Contractor does not transfer the records to PSTA in accordance with (d) below; and (d) upon completion or termination of the Contract, (i) if PSTA, in its sole and absolute discretion, requests that all Public Records in possession of the Contractor be transferred to PSTA, the Contractor shall transfer, at no cost, to PSTA, all Public Records in possession of the Contractor within thirty (30) days of such request or (ii) if no such request is made by PSTA, the Contractor shall keep and maintain the Public Records required by PSTA to perform the Work contemplated by the Contract. If the Contractor transfers all Public Records to PSTA pursuant to (d)(i) above, the Contractor shall destroy any duplicate Public Records that are exempt or confidential and exempt from Public Records disclosure requirements within thirty (30) days of transferring the Public Records to PSTA and provide PSTA with written confirmation that such records have been destroyed within thirty (30) days of transferring the Public Records. If the Contractor keeps and maintains Public Records pursuant to (d)(ii) above, the Contractor shall meet all applicable requirements for retaining Public Records. All Public Records stored electronically must be provided to PSTA, upon request from PSTA's custodian of public records, in a format that is compatible with the information technology of PSTA. If the Contractor does not comply with a Public Records request, or does not comply with a Public Records request within a reasonable amount of time, PSTA may pursue any and all remedies available in law or equity including, but not limited to, specific performance. The provisions of this section only apply to those tasks in which Contractor is acting on behalf of PSTA.

IF THE CONTRACTOR HAS QUESTIONS REGARDING THE APPLICATION OF CHAPTER 119, FLORIDA STATUTES, TO THE CONTRACTOR'S DUTY TO PROVIDE PUBLIC RECORDS RELATING TO THE CONTRACT, CONTACT THE CUSTODIAN OF PUBLIC RECORDS AT:

Telephone number: 727-540-1806 E-mail address: Records@psta.net Mailing address: Attn: Public Records Department 3201 Scherer Drive N., Saint Petersburg, Florida 33716

GC 9.11 General Nondiscrimination Clause

In connection with the performance of the Services provided for under this Contract, the Contractor agrees that it will not, on the grounds of race, religious creed, color, national origin, ancestry, physical disability, medical condition, marital status, sex, sexual orientation or age, discriminate or permit discrimination against any person or group of people in any manner prohibited by federal, state or local laws.

GC 9.12 Amendment and Waiver

GC 9.12.1 Amendment

Any modification or amendment of any provisions of any of the Contract Documents shall be effective only if in writing, signed by authorized representatives of both the Agency and Contractor, and specifically referencing this Contract.

GC 9.13 Waiver

In the event that either party elects to waive its remedies for any breach by the other party of any covenant, term or condition of this Contract, such waiver shall not limit the waiving party's remedies for any succeeding breach of that or of any other term, covenant or condition of this Contract.

GC 9.14 Remedies Not Exclusive

The rights and remedies of the Agency provided herein shall not be exclusive and are in addition to any other rights and remedies provided by law or under the Contract.

GC 9.15 Counterparts

This Contract may be executed in any number of counterparts. All such counterparts shall be deemed to constitute one and the same instrument, and each of said counterparts shall be deemed an original thereof.

GC 9.16 Severability

Whenever possible, each provision of the Contract shall be interpreted in a manner as to be effective and valid under applicable law. However, if any provision, or part of any provision, should be prohibited or invalid under applicable law, then such provision, or part of such provision, shall be ineffective to the extent of such prohibition or invalidity without invalidating the remainder of such provision or the remaining provisions of the Contract.

GC 9.17 Third-Party Beneficiaries

No provisions of the Contract shall in any way inure to the benefit of any third party, including the public at large, so as to constitute such person a third-party beneficiary of the Contract or of any one or more of the terms and conditions of the Contract or otherwise give rise to any cause of action in any person not a party to the Contract, except as expressly provided elsewhere in the Contract.

GC 9.18 Assignment of Contract

Neither party will assign or subcontract its rights or obligations under the Contract without prior written permission of the other party, and no such assignment or subcontract will be effective until approved in writing by the other party.

GC 9.19 Independent Parties

The Contractor is an independent contractor with respect to the performance of all Work hereunder, retaining control over the detail of its own operations, and the Contractor shall not be considered the agent, employee, partner, fiduciary or trustee of the Agency.

GC 9.20 Survival

The following sections shall survive the nominal expiration or discharge of other Contract obligations, and the Agency may obtain any remedy under law, Contract or equity to enforce the obligations of the Contractor that survive the manufacturing, warranty and final payment periods:

- "Intellectual Property Warranty"
- "Data Rights"
- "Indemnification"
- "Governing Law and Choice of Forum"
- "Disputes"
- "Parts Availability Guarantee"

- "Access to Records"
- "Training"

GC 9.21 Binding Affect; Assignment and Subcontracting

GC .20.1 Binding Affect.

The terms and provisions of this Contract shall be binding upon PSTA and the Contractor and each of their respective partners, successors, heirs, executors, administrators, assigns and legal representatives.

GC 9.20.3 Responsibility for Subcontractors.

If the Contractor's assignee, Supplier, sub-supplier or subcontractor fails to perform in accordance with the terms of this Contract, the Contractor shall complete or pay to have completed the work which the assignee or subcontractor failed to complete at no additional cost to PSTA. In the event of any noncompliance by any assignee or subcontractors, the Contractor shall be directly and wholly responsible for the noncompliance of its assignee or subcontractor and shall bear all attributable costs.

GC 9.20.5 E-Verify.

The Contractor shall utilize the U.S. Department of Homeland Security's E-Verify System to verify the employment eligibility of: (a) all persons employed by Contractor throughout the term of this Contract; and (b) all persons, including subcontractors, retained or hired by the Contractor, regardless of compensation, to perform the Services.

GC 9.22 Responsibility of Proposer

PSTA will only award a Contract to a firm which it has determined to be responsible. A responsible Contractor is one which meets the following standards:

A. Integrity and Ethics: Has a satisfactory record of integrity and business ethics, in compliance with 49 U.S.C. Section 5325(j)(2)(A).

B. Affirmative Action and DBE: Is in compliance with Common Grant Rules affirmative action and DOT's DBE requirements.

C. Public Policy: Is in compliance with the public policies of the Federal Government, as required by 49 U.S.C. Section 5325 (j)(2)(D).

D. Administrative and Technical Capacity: Has the necessary organization, experience, accounting, and operational controls and technical skills, or the ability to obtain them in compliance with 79 U.S.C. Section 5325(j)(2)(D).

E. Licensing and Taxes: Is in compliance with applicable licensing and tax laws and regulations.

GC 9.23 Advertisement

Contractor shall not advertise or publish news releases concerning this Contract without prior written consent of PSTA.

GC 9.24 Non-exclusive Contract.

PSTA specifically reserves the right to contract with other entities for the Services described in the Contract Documents or for similar Services if it deems, in its sole discretion, such action to be in PSTA's best interest.

SECTION 4: SPECIAL PROVISIONS

SP 1. Inspection, Tests and Repairs

SP 1.1 Repair Performance

SP 1.1.1 Repairs by Contractor

After non-acceptance of a bus, the Contractor must begin work within five (5) working days after receiving notification from the Agency of failure of acceptance tests. The Agency shall make the bus available to complete repairs timely with the Contractor repair schedule.

The Contractor shall provide, at its own expense, all spare parts, tools and space required to complete the repairs. At the Agency's option, the Contractor may be required to remove the bus from the Agency's property while repairs are being made. If the bus is removed from the Agency's property, then repair procedures must be diligently pursued by the Contractor's representatives, and the Contractor shall assume risk of loss while the bus is under its control.

SP 1.1.2 Repairs by the Agency

The Agency will not take responsibility to correct Defects, except to replace defective parts as instructed by the Contractor.

1. **Parts used.** If the Agency performs the repairs after non-acceptance of the bus, it shall correct or repair the Defect and any Related Defects using Contractor-specified parts available from its own stock or those supplied by the Contractor specifically for this repair. Reports of all repairs covered by this procedure shall be submitted by the Agency to the Contractor for reimbursement or replacement of parts monthly, or at a period to be mutually agreed upon. The Contractor shall provide forms for these reports.
2. **Contractor-supplied parts.** If the Contractor supplies parts for repairs being performed by the Agency after non-acceptance of the bus, then these parts shall be shipped prepaid to the Agency.
3. **Return of defective components.** The Contractor may request that parts covered by this provision be returned to the manufacturing plant. The total costs for this action shall be paid by the Contractor.
4. **Reimbursement for labor.** The Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by the Agency for a qualified mechanic at a straight time wage rate of $65.00, which includes fringe benefits and overhead adjusted for the Agency's most recently published rate in effect at the time the Work is performed, plus the cost of towing in the bus, if such action was necessary. These wage and fringe benefits rates shall not exceed the rates in effect in the Agency's service garage at the time the Defect correction is made.
5. **Reimbursement for parts.** The Agency shall be reimbursed by the Contractor for defective parts that must be replaced to correct the Defect. The reimbursement shall include taxes where applicable and fifteen (15) percent handling costs.

SP 1.2 Pilot Bus

The Contractor shall produce one pilot vehicle for each type of vehicle with respect to the base order. This vehicle shall be one of the ultimate quantity of the base vehicle order. The pilot vehicle shall demonstrate that the vehicles fully meet all requirements of the Contract. The pilot vehicle shall be produced and delivered to the Agency for a minimum of thirty (30) days prior to initiation of any production activities for the remaining vehicles unless otherwise authorized in writing by the Agency. In the event that noncompliance is identified, the Agency shall to the extent practicable notify the Contractor of said noncompliance. No later than seven (7) days after the end of the 30-day test, the Agency shall issue a written report to the Contractor that advises the

Contractor of any noncompliance issues and/or any proposed modifications or changes required on the remaining vehicles.

In the event that the pilot vehicle does not initially comply with all performance criteria contained in the Technical Specifications, the Agency shall have the right to retain a portion of any progress payment that may have been established for the pilot vehicle. The amount to be withheld shall be based on the lack of compliance and may equal up to the entire progress payment amount for the pilot vehicle. This amount shall be withheld until compliance is demonstrated. In the event that the compliance is subsequently determined to be impossible to achieve, the Agency may require all or a portion of the progress payment for the pilot vehicle to be forfeited as a penalty for the noncompliance. The amount of the penalty shall be negotiated by the parties.

SP 1.3 Configuration and Performance Approval

In order to assess the Contractor's compliance with the Technical Specifications, the Agency and the Contractor shall, at the Pre-Production Meeting, jointly develop a configuration and performance review document for review of the pilot vehicle. This document shall include appropriate performance standards for each test that is being required, and the document shall become part of the official record of the Pre-Production Meeting.

SP 1.4 First Article Inspection – Production

The purpose of a first article inspection is to confirm that any components, systems, subsystems, major assemblies, subassemblies, products, parts, apparatuses, articles and other materials comply with the Technical Specifications and other Contract Documents.

Where required by the Contract Documents or requested by the Agency, the Contractor shall cause first article inspections to be conducted. A first article inspection may include both a physical configuration inspection and a functional demonstration. First article inspections shall be conducted at the Contractor or Subcontractor's facility. The Contractor shall furnish to the Agency prior to each first article inspection a written inspection and demonstration plan for each item for review. The Agency's inspectors will attend each first article inspection unless the Agency provides a written waiver of its right to attend any such inspection. The results of each first article inspection shall be documented by the Contractor in a format deemed acceptable by the Agency, and all documents relating to the inspection shall be forwarded to the Agency.

SP 1.5 Post-Delivery Tests

The Agency will conduct acceptance tests on each delivered bus. These tests shall be completed within fifteen (15) days after bus delivery and shall be conducted in accordance with written test plans. The purpose of these tests is to identify Defects that have become apparent between the time of bus release and delivery to the Agency. The post-delivery tests shall include visual inspection and bus operations. No post-delivery test shall apply criteria that are different from the criteria applied in an analogous pre-delivery test (if any).

Buses that fail to pass the post-delivery tests are subject to non-acceptance. The Agency shall record details of all Defects on the appropriate test forms and shall notify the Contractor of acceptance or non-acceptance of each bus according to "Inspection, Testing and Acceptance" after completion of the tests. The Defects detected during these tests shall be repaired according to the procedures defined in "Repairs after Non-Acceptance."

SP 1.6 Repairs after Non-Acceptance

The Contractor, or its designated representative, shall perform the repairs after non-acceptance. If the Contractor fails or refuses to begin the repairs within five (5) days, then the Work may be done by the Agency's personnel with reimbursement by the Contractor.

SP 2. Deliveries

SP 2.1 Bus Delivery

Delivery of buses shall be determined by signed receipt of PSTA's Director of Maintenance or designee, at the following point(s) of delivery: 3201 Scherer Dr. St. Petersburg, FL 33716.

SP 2.2 Delivery Schedule

The buses shall be delivered per PSTA's Purchase Order. Delivery shall be completed within the agreed upon timeframe by PSTA and Contractor after each bus order. Hours of delivery shall be between 8:00 a.m. and 5:00 p.m., Monday through Friday.

SP 2.3 FOB Point of Delivery

All pricing, labor, equipment, materials, products and services are to be FOB destination and delivered to PSTA at the address indicated.

SP 2.4 Contract Deliverables

Contract deliverables associated with this Contract are set forth in **Table 1**, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
1.	Bus Testing— Altoona Test Report	Review		Prior to pilot bus delivery	Hardcopy **or** Electronic media	1
2.	List of serialized units installed on each bus	Review		With each delivered bus	Electronic media	1 per bus
3.	Copy of Manufacturers' formal Quality Assurance Program	Review		Pre-award site visit	Hardcopy **or** Electronic media	1
4.	QA manufacturing certificate	Review		With each delivered bus	Hardcopy **or** Electronic media	1 per bus
5.	QA purchasing certifications acknowledging receipt of applicable specification	Review		30 days following first Pre-Production Meeting	Hardcopy **or** Electronic media	1 per major Supplier
6.	Pre-Delivery Bus Documentation Package	Review		With each delivered bus	Hardcopy **or** Electronic media	1 per bus

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
9.	Pre-Production Meeting minutes	Approval		30 days after each meeting	Hardcopy **or** Electronic media	2 originals
10.	Driver's log and incident report	Review		With each bus delivery if drive-away service is used	Hardcopy **or** Electronic media	1 per bus
11.	Title documentation	Review		10 days prior to bus delivery	Hardcopy **or** Electronic media	1 per bus
12.	Performance bond	Review		30 days following execution of Contract	Hardcopy **or** Electronic media	1
13.	Insurance certificates	Approval		Before Work commences	Hardcopy **or** Electronic media	1
14.	Engineering support	Review		During Pre-Production Meeting	Contracts	1
15.	Training instructor information	Approval		30 days prior to delivery of pilot bus		
16.	Training curriculum	Approval		30 days prior to delivery of pilot bus	Electronic media	
17.	Teaching materials	Review		During classroom instruction	Hardcopy **or** Electronic media	1
18.	Professionally prepared mechanics' "Bus Orientation" training video	Review		30 days prior to first production bus	Electronic Media	20 each
19.	Final preventative maintenance manuals	Review		90 days after Agency written approval	Hardcopy Electronic media	10/100 buses 20
20.	Final diagnostic procedures manuals	Review		90 days after Agency written approval	Hardcopy Electronic media	10/100 buses 20
21.	Final parts manuals	Approval		90 days after Agency written approval	Hardcopy Electronic media	10/100 buses 20
22.	Component repair manuals (Agency approval/review period of 90 days from date of receipt)	Approval		90 days after Agency written approval of OEM component repair list	Hardcopy Electronic media	2 2

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
23.	Draft preventative maintenance manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	Hardcopy **or** Electronic media	10
24.	Draft diagnostic procedures manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	Hardcopy **or** Electronic media	10
25.	Draft parts manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	Hardcopy **or** Electronic media	10
26.	List of OEM component repair manuals	Approval		With pilot bus	Hardcopy **or** Electronic media	10
27.	Draft operators' manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus or maximum of 30 days prior to start of production	Hardcopy **or** Electronic media	10
28.	Final operators' manuals	Review		30 days following Agency approval of draft manual	Hardcopy **or** Electronic media	1 per bus
29.	Recommended spare parts list, including bill of materials	Review		60 days prior to shipment of first bus	Hardcopy **or** Electronic media	1
30.	Part number index	Approval		60 days prior to shipment of first bus	Hardcopy Spreadsheet	1 1
31.	Current price list	Review		90 days after Agency written approval of draft parts manual	Hardcopy	20
32.	In-process drawings	Review		30 days prior to production	Scale drawings	1
33.	Electrical and air schematics	Review		30 days prior to production	Hardcopy **or** Electronic media	1
34.	As-built drawings	Review		Within 60 days after final bus delivery	Electronic media	1
35.	Material samples	Review		By conclusion of Pre-Production Meetings		1
36.	Undercoating system program	Approval		First Pre-Production Meeting	Hardcopy **or** Electronic media	1
37.	Flooring certificate	Review		First Pre-Production Meeting	Certificate/ copy of purchase order	1
38.	Interior features – fire-resistance certificates	Review		Prior to pilot bus completion	Certificates	1
39.	Crashworthiness	Review		Pre-award audit	Certificate	1

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
40.	Technical review of electronic functionality	Approval		Prior to production	Hardcopy **or** Electronic media	1
41.	Interior security camera layout	Approval		Prior to pilot bus completion	Copies of interior views	1 each
42.	Technical review of power plant			Prior to production		
43.	Power plant certifications	Review		Prior to pilot bus completion	Hardcopy **or** Electronic media	1 each
44.	Striping layout	Approval		Prior to production	Hardcopy **or** Electronic media	1
45.	Resolution of issues “subject to Agency approval”	Approval		Prior to production	Hardcopy **or** Electronic media	1

SP 3. Payment

Payment due date is calculated from time the Agency Accounts Payable Accountant has received and accepted the invoice pursuant to the Florida Prompt Payment Act. Payment due date for purchase of goods or services other than construction services is net forty-five (45) days from the accepted date. No advance payments are authorized. Payment will be made for only actual services or commodities that have been received and accepted by the Agency.

SP 3.1 Payment Terms

Option 1: Payment upon Delivery

All payments shall be made as provided herein, less any additional amount withheld as provided below and less any amounts for liquidated damages in accordance with “Liquidated Damages for Late Delivery of the Bus.”

The Agency shall make payments for buses at the unit prices itemized in the price schedule within 45 days after the delivery and acceptance of each bus and receipt of a proper invoice.

The Agency shall make payments for spare parts and/or equipment at the unit prices itemized in the price schedule within 45 days after the delivery and acceptance of said spare parts and/or equipment and receipt of a proper invoice.

The Agency shall make a final payment for all withholding within 45 days of receipt of a final proper invoice and the following:

1. Delivery and acceptance of all Contract deliverables, including manuals and other documentation required by the Contract, excluding training.
2. Contractor provision of any certifications as required by law and/or regulations.
3. Completion of post-delivery audits required under the Contract.

The Contractor may charge interest for late payment if payment is delayed more than ten (10) days after the payment Due Date set forth above. Interest will be charged at a rate not to exceed the prime rate of interest published by The Wall Street Journal on the 10th day.

SP 3.2 Payment of Taxes

PSTA is exempt from payment of all Federal, State, and local taxes in connection with this RFP. Said taxes shall not be included in the Proposal or Proposal prices. PSTA will provide necessary tax exemption certificates. This provision does not relieve the Contractor from the responsibility to pay all applicable taxes for goods, services, and labor acquired in the performance of the Services.

SP 4. Liquidated Damages

PSTA and the Contractor acknowledge and agree that, since time is of the essence for the Contract, PSTA will suffer damages if the Services, and all Work associated with the Services, is not completed within the time specified by the Delivery Schedule and final completion and acceptance within the Contract Time. In such event, the total amount of PSTA's damages will be difficult, if not impossible, to ascertain and quantify. It is therefore hereby agreed that it is appropriate and fair that PSTA receive liquidated damages from the Contractor if the Contractor fails to timely complete the Services within the Contract Time and all deliverables associated with the Services within the time set forth on the Delivery Schedule. PSTA shall be entitled to assess TWO HUNDRED U.S. DOLLARS and NO/100 ($200.00) per each calendar day until the Services is fully and finally completed and/or deliverable is received by PSTA with no cap on this assessment. The Contractor hereby expressly waives and relinquishes any right which it may have to seek to characterize the liquidated damages set forth herein as a penalty, which the parties agree represents a fair and reasonable estimate of PSTA's damages as of the Effective Date.

SP 5. Service and Parts

SP 5.1 Contractor Service and Parts Support

The Contractor shall state on the form Contractor Service and Parts Support Data the representatives responsible for assisting the Agency, as well as the location of the nearest distribution center, which shall furnish a complete supply of parts and components for the repair and maintenance of the buses to be supplied. The Contractor also shall state below, or by separate attachment, its policy on transportation charges for parts other than those covered by warranty.

SP 5.2 Documentation

The Contractor shall provide an electronic copy and three (3) printed current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy and three (3) printed current parts manual(s), and an electronic copy and three (3) printed standard operator's manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator's manuals and parts books up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.

SP 5.3 Parts Availability Guarantee

The Contractor hereby guarantees to provide, within reasonable periods of time, the spare parts, software and all equipment necessary to maintain and repair the buses supplied under this Contract for a period of at least twelve (12) years after the date of acceptance. Parts shall be interchangeable with the original equipment and

shall be manufactured in accordance with the quality assurance provisions of this Contract. Prices shall not exceed the Contractor's then-current published catalog prices.

Where the parts ordered by the Agency are not received within two (2) working days of the agreed-upon time and date and a bus procured under this Contract is out of service due to the lack of said ordered parts, then the Contractor shall provide the Agency, within eight (8) hours of the Agency's verbal or written request, the original Suppliers' and/or manufacturers' part numbers, company names, addresses, telephone numbers and contact persons' names for all the specific parts not received by the Agency.

Where the Contractor fails to honor this parts guarantee or parts ordered by the Agency are not received within thirty (30) days of the agreed-upon delivery date, then the Contractor shall provide to the Agency, within seven (7) days of the Agency's verbal or written request, the design and manufacturing documentation for those parts manufactured by the Contractor and the original Suppliers' and/or manufacturers' part numbers, company names, addresses, telephone numbers and contact persons' names for all of the specific parts not received by the Agency. The Contractor's design and manufacturing documentation provided to the Agency shall be for its sole use in regard to the buses procured under this Contract and for no other purpose.

SP 5.4 Agency-Furnished Property

In the event that equipment or other goods or materials are specified in the Technical Specifications to be furnished by the Agency to the Contractor for incorporation in the Work, the following provisions shall apply:

1. The Agency shall furnish the equipment, goods or materials in a timely manner so as not to delay Contract delivery or performance dates. If Agency-furnished property is received in a condition not suitable for the intended use, then the Contractor shall promptly notify the Agency, detailing the facts, and at the Agency's expense repair, modify, return or take such other action as directed by the Agency. The parties may conduct a joint inspection of the property before the Contractor takes possession to document its condition.
2. The Agency retains title to all Agency-furnished property. Upon receipt of the Agency-furnished property, the Contractor assumes the charge and care of the property and bears the risk of loss or damage due to action of the elements or from any other cause. The Contractor shall provide appropriate protection for all such property during the progress of the Work. Should any Agency-furnished equipment or materials be damaged, such property shall be repaired or replaced at the Contractor's expense to the satisfaction of the Agency. No extension of time will be allowed for repair or replacement of such damaged items. Should the Contractor not repair or replace such damaged items, the Agency shall have the right to take corrective measures itself and deduct the cost from any sums owed to the Contractor.
3. Warranty administration and enforcement for Agency-furnished equipment are the responsibility of the Agency, unless the parties agree to transfer warranty responsibility to the Contractor.

SP 6. Federal Motor Vehicle Safety Standards (FMVSS)

The Contractor shall submit a manufacturer's FMVSS self-certification, Federal Motor Vehicles Safety Standards, that the vehicle complies with relevant FMVSS or two manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

SP 7. Insurance

Contractor must provide a certificate of insurance and endorsement in accordance with the insurance requirements listed below by the Effective Date. Failure to provide insurance by the Effective Date shall constitute a material breach of the Contract and may result in PSTA terminating this Contract, without any penalty or expense to PSTA.

Delays in commencement due to failure to provide satisfactory evidence of insurance shall not extend deadlines. Any penalties and failure to perform assessments shall be imposed as if the work commenced as scheduled. In the event Contractor has subcontractors perform any portion of the work in the Contract Documents; either Contractor shall name those subcontractors as "additional insured" or each Subcontractor shall be required to have the same insurance requirements as Contractor. Insurance must be maintained throughout the entire term of this Contract, insurance of the types and in the amounts set forth. Failure to do so may result in suspension of all work until insurance has been reinstated or replaced or termination of this Contract. For services with a "Completion Operation Exposure", Contractor shall maintain coverage and provide evidence of insurance for two (2) years beyond final acceptance. Any penalties and failure to perform assessments shall be imposed as if the work had not been suspended.

All insurance policies shall be from responsible companies duly authorized to do business in the State of Florida and have a minimum rating of "A-" as assigned by AM Best. Contractor shall provide PSTA with properly executed and approved Certificates of Insurance to evidence compliance with the insurance requirements to PSTA's Purchasing/Risk Management Division. A copy of the additional insured endorsement(s) for Commercial General Liability needs to be attached to the certificates. If Contractor has been approved by the Florida State Department of Labor, as an authorized self-insured for Workers' Compensation, PSTA's Purchasing/Risk Management Department shall recognize and honor such status. Contractor may be required to submit a Letter of Authorization issued by the Department of Labor and a Certificate of Insurance, providing details on Contractor's Excess Insurance Program. If Contractor participates in a self-insurance fund, updated financial statements may be required upon request, such self-insurance fund shall only be accepted, at the sole discretion of PSTA, and only if PSTA finds the financial statements to be acceptable. Contractor shall provide to PSTA's Purchasing/Risk Management Department, satisfactory evidence of the required insurance by, either:

- A Certificate of Insurance with the additional insured endorsement.
- A Certified copy of the actual insurance policy.
- The Most Recent Annual Report or Audited Financial Statement (Self-Insured Retention (SIR) or deductible exceeds $100,000).

PSTA, at its sole option, has the right to request a certified copy of policies required by this Contract. Notwithstanding the prior submission of a Certificate of Insurance, copies of endorsements, or other evidence initially acceptable to the PSTA, if requested by the PSTA, Contractor shall, within thirty (30) days after receipt of a written request from the PSTA, provide the PSTA with a certified copy or certified copies of the policy or policies providing the coverage required herein. Contractor may redact or omit, or cause to be redacted or omitted, those provisions of the policy or policies which are not relevant to the insurance required herein.

The acceptance and approval of Contractor's Insurance shall not be construed as relieving Contractor from liability or obligation assumed under this Contract or imposed by law. PSTA, Board Members, Officers and Employees will be included "Additional Insured" on all policies, except Workers' Compensation and Professional Liability coverage.

Should at any time Contractor not maintain the insurance coverage's required by this Contract, PSTA may either cancel or suspend delivery of goods or services as required by Contractor or, at its sole discretion, shall be authorized to purchase such coverage and charge Contractor for such coverage purchased. PSTA shall be under no obligation to purchase such insurance or be responsible for the coverage's purchased or the responsibility of the insurance company/companies used. The decision of PSTA to purchase such insurance coverages shall in no way be construed to be a waiver of its rights.

Any certificate of insurance evidencing coverage provided by a leasing company for either workers' compensation or commercial general liability shall have a list of employees certified by the leasing company attached to the certificate of insurance. PSTA shall have the right, but not the obligation to determine that Contractor is only using employees named on such a list to perform Work on the jobsite. Should employees not be named be utilized by Contractor, Contractor has the option to work without penalty until PSTA identify proof of coverage or removal of the employee by Contractor occurs, or alternately find Contractor to be in default and takes over the protective measures as needed.

The insurance provided by Contractor shall apply on a primary basis to any insurance or self-insurance maintained by any participating agency. Any insurance, or self-insurance, maintained by a participating agency shall be excess of, and shall not contribute with, the insurance provided by Contractor.

Except as otherwise specifically authorized in this Contract, or for which prior written approval has been obtained hereunder, the insurance maintained by Contractor shall apply on a first dollar basis without application of a deductible or self-insured retention. Under limited circumstances, PSTA may permit the application of a deductible or permit Contractor to self-insure, in whole or in part, one or more of the insurance coverages required by this Contract. In such instances, Contractor shall pay on behalf of PSTA and PSTA's board members, officers or employees, any deductible or self-insured retention applicable to a claim against PSTA and PSTA's board members, officer(s) or employee(s).

Waivers. All insurance policies, other than Professional Liability, shall include waivers of subrogation in favor of PSTA, from Contractor and Contractor will ensure the compliance with any subcontractors.

Project Specific Insurance Requirements - The Following policies and minimum coverage shall be maintained throughout the entire term of this Contract which shall remain in effect throughout its duration and for two (2) years beyond final acceptance for services with a Completed Operations exposure, are as follows:

Commercial General Liability Insurance: including, but limited to, Independent Contractors, Contractor Liability Premises/Operations, Completed Operations, and Personal Injury. Such insurance shall be no more restrictive than that provided by the most recent version of standard Commercial General Liability Form (ISO Form CG 00 01) as filed for use in the State of Florida without any restrictive endorsements. PSTA, its board members, officers, and employees shall be added as an "Additional Insured" on a form no more restrictive than ISO Form CG 20 10 (Additional Insured-Owners, Lessees, or Contractors).

Minimum required Commercial General Liability coverage will include:

(i) Premises Operations
(ii) Products and Completed Operations
(iii) Blanket Contractual Liability
(iv) Personal Injury Liability
(v) Expanded Definition of Property Damage
(vi) $1,000,000/Occurrence; $3,000,000 AggregatencuOccc

An Occurrence Form Policy is preferred. If coverage is a Claims Made Policy, provisions should include for claims filed on or after the effective date of this Contract. In addition, the period for which claims may be reported should extend for a minimum of two (2) years following the expiration of this Contract.

Vehicle Liability Insurance - Recognizing that the work governed by the Contract Documents requires the use of vehicles, Contractor, prior to the commencement of work, shall obtain Vehicle Liability Insurance. Coverage shall be maintained throughout the life of this Contract and include, as a minimum, liability coverage for:

- Owned, Non-owned, and Hired vehicles and with the minimum limits at $1,000,000 Combined Single Limit (CSL).

This policy should not be subject to any aggregate limit.

Workers' Compensation Insurance. Prior to beginning work, Contractor shall obtain Workers' Compensation Insurance with must have limits sufficient to meet the requirements of Florida Statutes Limits per Chapter 440. Contractor shall maintain throughout, and will remain in force during the term of this Contract for all employees engaged in work under this Contract.

The Employers' Liability Insurance with limits no less than:

- $500,000 Bodily Injury by Accident
- $1,000,000 Bodily Injury by Disease, policy limits
- $500,000 Bodily Injury by Disease, each employee.

The Workers' Compensation policy must be endorsed to waive the insurer's right to subrogate against the all participating agencies, and their respective officers and employees in the manner which would result from the attachment of the NCCI Waiver Of Our Right To Recover From Others Endorsement (Advisory Form WC 00 03 13) with all participating agencies, and their officers and employees scheduled thereon.

Professional Liability Insurance: Professional Liability Insurance recognizes that the work governed by this Contract involves the furnishing of advice or services of a professional nature, Contractor shall purchase and maintain throughout the life of this Contract, Professional Liability Insurance which will respond to damages resulting from any claim arising out of the performance of professional services or any error or omission of Contractor arising out of work governed by this Contract.
The minimum limits of liability shall be:

- $1,000,000 per Claims Made Bases/or per Occurrence
- $3,000,000 Aggregate

If coverage is provided on a claims made basis, Contractor agrees to maintain such Professional Liability Insurance, as described herein, for a period of at least two (2) years following the conclusion of this Contract, or purchase an extended claims reporting period of two (2) years following the expiration of this Contract.

Garagekeepers' Coverage (Legal Liability Form) - Garagekeepers' Liability Insurance is to be purchased to cover the Contractor/Vendor's liability for damage or loss, including comprehensive and collision risks, to PSTA's vehicles while in the care, custody, and control of the Contractor/Vendor.

Limits of Liability – Equal to full value of vehicles and equipment.

SP 8. Software Escrow Account

All the Contractor's policies shall contain an endorsement naming the Agency as an additional insured and providing that written notice shall be given to the Agency's location at least thirty (30) days prior to termination, cancellation or material reduction of coverage in the policy, provided, however, that such notice may be given on ten (10) days' notice if the termination is due to nonpayment of premium.

Upon execution of the Contract, the Contractor shall provide the Agency a list of all OEM software comprising proprietary works ("Proprietary Software") for all major vehicle subsystems. From time to time and only upon request, information contained within the listed software may be made available to the Agency through the OEM of the vehicle subsystem. The Contractor and OEM are not obligated to provide copies of source code, as this is proprietary intellectual property; however, the Contractor is obligated to assist the Agency with any technical assistance for the duration of the life of the vehicle. It is the Agency's prerogative to evaluate the long-term viability of the Contractor and its Subcontractors and Suppliers based upon the criteria set forth in "Qualification Requirements."

SP 9. Sustainability

The Agency recognizes that being sustainable (environmentally, economically and socially responsible) involves everyone, both internal and external to the Agency. The Agency expects its Contractors to have their own sustainability policies and programs in place and to provide services in line with the principles established therein. Implementation of sustainable practices may include maximizing the use of environmentally and socially responsible materials and services, using energy-efficient and non-polluting vehicles, equipment and processes, and ensuring employee awareness of sustainability initiatives.

The Agency has a sustainability policy that includes the responsibility to make sure all of its Contractors are informed of this policy. The Contractor will provide the Agency with a statement indicating that responsible parties have read and understand the Agency's sustainability policies and that it agrees to use reasonable efforts to conduct its work and operations in a manner that is consistent with them. In addition the Contractor will provide the Agency with a copy of its corporate sustainability policy.

SECTION 5: FEDERAL REQUIREMENTS

FR 1. Access to Records

The Contractor agrees to maintain all books, records, accounts and reports required under this Contract for a period of not less than three years after the date of termination or expiration of this Contract, except in the event of litigation or settlement of claims arising from the performance of this Contract, in which case Contractor agrees to maintain same until the Agency, the FTA Administrator, the Comptroller General or any of their duly authorized representatives have disposed of all such litigation, appeals, claims or exceptions related thereto. Reference 49 CFR 18.39(i)(11).

The following access to records requirements apply to this Contract:

FR 1.1 Local Governments

In accordance with 49 CFR 18.36(i), the Contractor agrees to provide the Agency, the FTA Administrator, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor that are directly pertinent to this Contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor also agrees, pursuant to 49 CFR 633.17

to provide the FTA Administrator or his authorized representatives including any PMO Contractor access to Contractor's records and construction sites pertaining to a major capital project, defined at 49 USC 5302(a)1, which is receiving federal financial assistance through the programs described at 49 USC 5307, 5309 or 5311.

FR 1.2 State Governments

In accordance with 49 CFR 633.17, the Contractor agrees to provide the Agency, the FTA Administrator or his authorized representatives, including any PMO Contractor, access to the Contractor's records and construction sites pertaining to a major capital project, defined at 49 USC 5302(a)1, which is receiving federal financial assistance through the programs described at 49 USC 5307, 5309 or 5311. By definition, a major capital project excludes contracts of less than the simplified acquisition threshold currently set at $100,000.

The Contractor agrees to permit any of the foregoing parties to reproduce by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.

FR 2. Federal Funding, Incorporation of FTA Terms and Federal Changes

The preceding provisions include, in part, certain standard terms and conditions required by the Department of Transportation, whether or not expressly set forth in the preceding Contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1F or its successors 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 Contract. The Contractor shall not perform any act, fail to perform any act or refuse to comply with any Pinellas Suncoast Transit Authority (PSTA) requests that would cause PSTA to be in violation of the FTA terms and conditions.

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

FR 3. Federal Energy Conservation Requirements

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

FR 4. Civil Rights Requirements

The following requirements apply to this Contract:

1. **Nondiscrimination:** In accordance with Title VI of the Civil Rights Act, as amended, 42 USC§ 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 USC § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 USC § 12132, and federal transit law at 49 USC § 5332, the Contractor agrees that it will not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, the Contractor agrees to comply with applicable federal implementing regulations and other implementing requirements FTA may issue.
2. **Equal Employment Opportunity:** The following equal employment opportunity requirements apply to the underlying Contract:
    (a) **Race, Color, Creed, National Origin, Sex:** In accordance with Title VII of the Civil Rights Act, as amended, 42 USC § 2000e, and federal transit laws at 49 USC § 5332, the Contractor agrees to comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance

Programs, Equal Employment Opportunity, Department of Labor," 41 CFR Parts 60 *et seq.*, (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 USC § 2000e note), and with any applicable federal statutes, executive orders, regulations, and federal policies that may in the future affect construction activities undertaken in the course of the Services. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

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

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

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

FR 5. No Government Obligation to Third Parties

1. The Agency and Contractor acknowledge and agree that, notwithstanding any concurrence by the federal government in or approval of the Solicitation or award of the underlying Contract, absent the express written consent by the federal government, the federal government is not a party to this Contract and shall not be subject to any obligations or liabilities to the Agency, Contractor, or any other party (whether or not a party to that Contract) pertaining to any matter resulting from the underlying Contract.
2. The Contractor agrees to include the above clause in each subcontract financed in whole or in part with federal assistance provided by FTA. It is further agreed that the clause shall not be modified, except to identify the Subcontractor who will be subject to its provisions.

FR 6. Program Fraud and False or Fraudulent Statements or Related Acts

1. The Contractor acknowledges that the provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 USC §§ 3801 *et seq*. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 CFR Part 31, apply to its actions pertaining to these Services. Upon execution of the underlying Contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or it causes to be made, pertaining to the underlying Contract or the FTA-assisted project for which this Contract Work is being performed. In addition to other penalties that may be applicable, the Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious or fraudulent claim, statement, submission or certification, the federal government

reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on the Contractor to the extent the federal government deems appropriate.

2. The Contractor also acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the federal government under a Contract connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 USC § 5307, the government reserves the right to impose the penalties of 18 USC § 1001 and 49 USC § 5307(n)(1) on the Contractor, to the extent the federal government deems appropriate.
3. The Contractor agrees to include the above two clauses in each subcontract financed in whole or in part with federal assistance provided by FTA. It is further agreed that the clauses shall not be modified, except to identify the Subcontractor who will be subject to the provisions.

FR 7. Suspension and Debarment

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

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

By signing and submitting its bid or Proposal, the Bidder or Proposer certifies as follows:

The certification in this clause is a material representation of fact relied upon by Pinellas Suncoast Transit Authority (PSTA). If it is later determined that the Bidder or Proposer knowingly rendered an erroneous certification, in addition to remedies available to Pinellas Suncoast Transit Authority (PSTA), the federal government may pursue available remedies, including but not limited to suspension and/or debarment. The Bidder or Proposer agrees to comply with the requirements of 49 CFR 29, Subpart C, while this Proposal is valid and throughout the period of any Contract that may arise from this Proposal. The Bidder or Proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

FR 8. Disadvantaged Business Enterprise (DBE)

This Contract is subject to the requirements of Title 49, Code of Federal Regulations, Part 26, Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs.

The Contractor shall maintain compliance with “DBE Approval Certification” throughout the period of Contract performance.

The Contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this Contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of this DOT-assisted Contract. Failure by the Contractor to carry out these requirements is a material breach of this Contract, which may result in the termination of this Contract or such other remedy as Pinellas Suncoast Transit Authority (PSTA) deems appropriate. Each subcontract the Contractor signs with a Subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

FR 9. Clean Water Requirements

1. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 USC 1251 *et seq.* The Contractor agrees to report each violation to the Agency and understands and agrees that the Agency will, in turn, report each violation as required to ensure notification to FTA and the appropriate EPA Regional Office.

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

FR 10. Clean Air Requirements

1. The Contractor agrees to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 USC §§ 7401 *et seq*. The Contractor agrees to report each violation to the Agency and understands and agrees that the Agency will, in turn, report each violation as required to ensure notification to FTA and the appropriate EPA Regional Office.
2. The Contractor also agrees to include these requirements in each subcontract exceeding $100,000 financed in whole or in part with federal assistance provided by FTA.

FR 11. Compliance with Federal Lobbying Policy

Contractors who apply or bid for an award of $100,000 or more shall file the certification required by 49 CFR Part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any Agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any federal Contract, grant or any other award covered by 31 USC 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-federal funds with respect to that federal Contract, grant or award covered by 31 USC 1352. Such disclosures are forwarded from tier to tier up to the recipient.

FR 12. Buy America

The Contractor agrees to comply with 49 USC 5323(j) and 49 CFR Part 661, which provide that federal funds may not be obligated unless steel, iron and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver. General waivers are listed in 49 CFR 661.7.A general public interest waiver from the Buy America requirements applies to microprocessors, computers, microcomputers, software or other such devices, which are used solely for the purpose of processing or storing data. This general waiver does not extend to a product or device that merely contains a microprocessor or microcomputer and is not used solely for the purpose of processing or storing data.

Separate requirements for rolling stock are set out at 49 USC 5323(j)(2)(C) and 49 CFR 661.11. Rolling stock must be assembled in the United States and have more than 70 percent domestic content.

A Bidder or Proposer must submit to the Agency the appropriate Buy America Certification with all offers on FTA-funded contracts, except those subject to a general waiver. Proposals that are not accompanied by a properly completed Buy America certification are subject to the provisions of 49 CFR 661.13 and may be rejected as nonresponsive.

FR 13. Testing of New Bus Models

The Contractor agrees to comply with 49 USCA 5323(c) and FTA's implementing regulation at 49 CFR Part 665 and shall perform the following:

1. A manufacturer of a new bus model or a bus produced with a major change in components or configuration shall provide a copy of the final test report to the recipient at a point in the procurement process specified by the recipient, which will be prior to the recipient's final acceptance of the first vehicle.

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

FR 14. Pre-Award and Post-Delivery Audits

The Contractor agrees to comply with 49 USC § 5323(l) and FTA's implementing regulation at 49 CFR Part 663 and to submit the following certifications:

1. **Buy America requirements:** The Contractor shall complete and submit a declaration certifying either compliance or noncompliance with Buy America. If the recommended Bidder/Proposer certifies compliance with Buy America, it shall submit documentation that lists (1) component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and (2) the location of the final assembly point for the rolling stock, including a description of the activities that will take place at the final assembly point and the cost of final assembly.
2. **Solicitation specification requirements:** The Contractor shall submit evidence that it will be capable of meeting the bid specifications.
3. **Federal Motor Vehicle Safety Standards (FMVSS):** The Contractor shall submit (1) manufacturer's FMVSS self-certification, Federal Motor Vehicle Safety Standards, that the vehicle complies with relevant FMVSS or (2) manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

FR 15. Cargo Preference

The Contractor agrees to the following:

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

FR 16. Fly America

The Contractor agrees to comply with 49 USC 40118 (the "Fly America" Act) in accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provide that recipients and sub-recipients of federal funds and their Contractors are required to use U.S. flag air carriers for U.S. government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. The Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S.-flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. The Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

FR 17. Contract Work Hours and Safety Standards Act

1. **Overtime requirements:** No Contractor or Subcontractor contracting for any part of the Contract Work that may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such Work to work in excess of 40 hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of 40 hours in such workweek.
2. **Violation; liability for unpaid wages; liquidated damages:** In the event of any violation of the clause set forth in paragraph 1 of this section, the Contractor and any Subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such Contractor and Subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph 1 of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 1 of this section.
3. **Withholding for unpaid wages and liquidated damages:** The Pinellas Suncoast Transit Authority (PSTA) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by the Contractor or Subcontractor under any such contract or any other federal contract with the same Prime Contractor, or any other federally assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same Prime Contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or Subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 2 of this section.
4. **Subcontracts:** The Contractor or Subcontractor shall insert in any subcontracts the clauses set forth in paragraphs 1 through 4 of this section and also a clause requiring the Subcontractors to include these clauses in any lower-tier subcontracts. The Prime Contractor shall be responsible for compliance by any Subcontractor or lower-tier Subcontractor with the clauses set forth in paragraphs 1 through 4 of this section.

SECTION 6: TECHNICAL SPECIFICATIONS

GENERAL

TS 1. Scope

Technical specifications define requirements for heavy-duty transit buses and commuter coaches, which, by the selection of specifically identified alternative configurations, may be used for both suburban express service and general service on urban arterial streets. Buses shall have a minimum expected life of twelve (12) years or 500,000 miles, whichever comes first, and are intended for the widest possible spectrum of passengers, including children, adults, the elderly and people with disabilities.

TS 2. Definitions

Alternative: An alternative specification condition to the default bus configuration. The Agency may define alternatives to the default configuration to satisfy local operating requirements. Alternatives for the default configuration will be clearly identified.

Ambient Temperature: The temperature of the surrounding air. For testing purposes, ambient temperature must be between 16 °C (50 °F) and 38 °C (100 °F).

Analog Signals: A continuously variable signal that is solely dependent upon magnitude to express information content.

Audible Discrete Frequency: An audible discrete frequency is determined to exist if the sound power level in any 1/3-octave band exceeds the average of the sound power levels of the two adjacent 1/3-octave bands by 4 decibels (dB) or more.

Automated Charging Station: A Charging System that automates the charging process to allow for on-route Fast Charge of buses with little required input from the bus operator. The charging is accomplished through either an inductive or conductive connection to facilitate safe charging of the bus in a location out of reach of bus passengers and which can be operated during boarding and de-boarding of passengers. The operator input is limited to left/right steering, emergency braking and Charging System “on”, and where departure occurs before completion of the charging process, Charging System “off” controls.

Battery Compartment: Designated area for placement of high-or low-voltage energy storage, i.e. 12/24 VDC batteries. Battery Compartments shall be separately designated as High Voltage Compartment, and Backup Battery Compartment.

Battery Management System (BMS): Monitors energy, as well as temperature, cell or module voltages, and total pack voltage. The BMS adjusts the control strategy algorithms to maintain the batteries at uniform state of charge and optimal temperatures.

Braking Resistor: Device that converts electrical energy into heat, typically used as a retarder to supplement or replace the regenerative braking.

Burst Pressure: The highest pressure reached in a container during a burst test.

Capacity: The water volume of a container in gallons (liters).

Cell: Simplest discrete component of the battery storage system, such as a battery or a capacitor.

Charger: The equipment required to convert Alternating Current (AC) to Direct Current (DC), for the purpose of charging the battery and/or operating vehicle electrical systems while connected. The Charger may be on-board the vehicle or off-board the vehicle. Off-board Chargers may be built as part of the charging station.

Charging Interface: The equipment and/or coupler used to create a connection between the charging equipment and the vehicle for the purpose of recharging a vehicle's batteries.

Charging Equipment: The equipment that encompasses all the components needed to convert, control, and transfer electricity from the grid to the vehicle for the purpose of charging batteries. May include chargers, controllers, couplers, transformers, ventilation, etc. See *Electric Vehicle Supply Equipment (EVSE)*.

Charging Station: Location that houses the charging equipment connected to a utility's electric service, to provide electricity to a vehicle's battery system through a charging interface.

Charging System: A system including the Charger, communication and control systems among the Charger, Energy Storage System and bus as well as the equipment required to perform the conductive connection between the Charger and the bus.

Class 1 Failure (physical safety): A failure that could lead directly to passenger or operator injury and represents a severe crash situation.

Class 2 Failure (road call): A failure resulting in an en route interruption of revenue service. Service is discontinued until the bus is replaced or repaired at the point of failure.

Conductive Charging Interface: A charging interface that creates a physical connection between the EVSE and vehicle's Energy Storage System to recharge the vehicle.

Code: A legal requirement.

Curb Weight: Weight of vehicle, including maximum fuel, oil and coolant; and all equipment required for operation and required by this Specification, but without passengers or driver.

dBA: Decibels with reference to 0.0002 microbar as measured on the "A" scale.

DC to DC Converter: A module that converts a source of direct current from one voltage level to another.

Default Configuration Bus: The bus described if no alternatives are selected. Signing, colors, the destination sign reading list and other information must be provided by the Agency.

Destroyed: Physically made permanently unusable.

Discrete Signal: A signal that can take only pre-defined values, usually of a binary 0 or 1 nature, where 0 is battery ground potential and 1 is a defined battery positive potential.

Driver's Eye Range: The 95th-percentile ellipse defined in SAE J941, except that the height of the ellipse shall be determined from the seat at its reference height.

Drive System Controller (DSC). Regulates energy flow throughout system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (voltages, currents, temperatures, etc.) within specified operating ranges.

Electric Drive System (EDS). The mechanical and/or electromechanical components, including the motor and energy storage system.

Electric Vehicle Supply Equipment (EVSE): The conductors, including the ungrounded, grounded, and equipment grounding conductors, the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatuses installed specifically for the purpose of delivering energy from the premises wiring to the battery electric vehicle.

Electrical Pack: An electrical equivalent of a collection of cells or modules or physical sub-packs forming the highest-level energy storage system. Often multiple physical sub-packs are connected in series, and these may also be connected in parallel.

Electric Vehicle Supply Equipment (EVSE): The conductors, including the ungrounded, grounded and equipment grounding conductors, the electric vehicle connectors, the attachment plugs, and all other fittings, devices, power outlets or apparatuses installed specifically for the purpose of delivering energy from the premises' wiring to the electric vehicle.

End of Life: A condition reached when an energy storage system fails to meet specified capacity, power or function in specified use conditions.

Energy Density: The relationship between the weight of an energy storage device and its power output in units of watt-hours per kilogram (Wh/kg).

Energy Storage System (ESS) / Energy Storage Device (ESD): A component or system of components that stores energy and for which its supply of energy is rechargeable by the on-vehicle system (engine/regenerative braking/ generator) or an off-vehicle energy source.

Energy System Controller (ESC): The ESC regulates energy flow throughout the electric system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (e.g., voltages, currents, temperatures, etc.) within specified operating ranges.

Fast Charge: A Charging System capable of charging the Energy Storage System during short in-route opportunity charging scenarios and simultaneously meeting the Operating Range requirements.

Fatigue Failure (Corrosion Fatigue): The mechanical degradation of a material under the joint action of corrosion and cyclic loading.

Fire Resistant: Materials that have a flame spread index less than 150 as measured in a radiant panel flame test per ASTM-E 162-90.

Fireproof: Materials that will not burn or melt at temperatures less than 2000 °F.

Free Floor Space: Floor area available to standees, excluding the area under seats, area occupied by feet of seated passengers, the vestibule area forward of the standee line, and any floor space indicated by manufacturer as non-standee areas, such as the floor space "swept" by passenger doors during operation. Floor area of 1.5 sq. ft. shall be allocated for the feet of each seated passenger protruding into the standee area.

Fusible Material: A metal, alloy or other material capable of being melted by heat.

GAWR (Gross Axle Weight Rated): The maximum total weight as determined by the axle manufacturer, at which the axle can be safely and reliably operated for its intended purpose.

Generator (Electric): A device that converts mechanical energy into electrical energy.

Gross Load: 150 lb for every designed passenger seating position, for the driver, and for each 1.5 sq. ft. of free floor space.

GFD/GFI (Ground Fault Detector / Ground Fault Interrupt): A system capable of detecting and If necessary interrupting a measurable resistance below that required by SAE J1766 between Isolated High Voltage and Low Voltage systems.

Gross Battery Capacity: Gross capacity would be measured in kWh and would be the energy available from the entire battery pack.

Gross Load: 150lbs for every designed passenger seating position, for the driver, and for each 1.5 sq. ft. of free floor space.

GVW (Gross Vehicle Weight): Curb weight plus gross load.

GVWR (Gross Vehicle Weight Rated): The maximum total weight as determined by the vehicle manufacturer, at which the vehicle can be safely and reliably operated for its intended purpose.

High Voltage (HV): Greater than 50 V(AC and DC).

Hose: Flexible line.

Inductive Charging Interface: A charging interface that uses an electromagnetic field to transfer energy between the EVSE and the vehicle's Energy Storage System to recharge the vehicle

Inverter: A module that converts DC to and from AC.

I/O: Input/Output for electrical systems

kVA: Kilovolt-Amps – A unit of power generally associated with electrical devices.

kWh: Kilowatt Hour—A derived unit of energy consumption.

kWh/mi: A method of computing average energy consumption on a per mile basis.

Labeled: Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization, which is acceptable to the authority having jurisdiction and concerned with product evaluation, which maintains periodic inspection of production labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Leakage: Release of contents through a Defect or a crack. See *Rupture*.

Line: All tubes, flexible and hard, that carry fluids.

Local Regulations: Regulations below the state level.

Low-Floor Bus: A bus that, between at least the front (entrance) and rear (exit) doors, has a floor sufficiently low and level so as to remove the need for steps in the aisle between the doors and in the vicinity of these doors.

Low Voltage (LV): 50 V or less (AC and DC).

Maximum Service Temperature: The maximum temperature to which a container/cylinder will be subjected in normal service.

Maximum Standard Operating State of Charge: The maximum design operating state of charge as recommended by the propulsion system integrator and battery manufacturer.

Metallic Hose: A hose whose strength depends primarily on the strength of its metallic parts; it can have metallic liners or covers, or both.

Module: A collection of cells forming a physical and electrical sub-assembly contained within an enclosure.

Motor (Electric): A device that converts electrical energy into mechanical energy.

Motor (Traction): An electric motor used to power the driving wheels of the bus.

Pack: A collection of cells or modules described on the basis of electrical or physical attributes, to include *Electrical Pack* and *Physical Pack*.

Physical Layer: The first layer of the seven-layer International Standards Organization (ISO) Open Systems Interconnect (OSI) reference model. This provides the mechanical, electrical, functional and procedural characteristics required to gain access to the transmission medium (e.g., cable) and is responsible for transporting binary information between computerized systems.

Physical Pack: An enclosure consisting of a collection of cells or modules at a location or multiple locations. Physical packs differ from electrical packs, as they are defined by layout rather than electrical equivalent.

Pipe: Nonflexible line.

Power: Work or energy divided by time

Power Density: Power divided by mass, volume or area.

Propulsion System: System that provides propulsion for the vehicle proportional to operator commands. Includes, , traction motors, , energy storage system (ESS), and system controllers including all wiring and converter/inverter.

Propulsion Power Unit (PPU): System of components that provide tractive power, such as traction motor.

Real-Time Clock (RTC): Computer clock that keeps track of the current time.

Regenerative Braking: Deceleration of the bus by switching motors to act as generators, which return vehicle kinetic energy to the energy storage system.

Retarder: Device used to augment or replace some of the functions of primary friction based braking systems of the bus.

Rupture: Sudden and unstable damage propagation in the structural components of the container resulting in a loss of contents. See *Leakage*.

Seated Load: 150 lb for every designed passenger seating position and for the driver.

Seated Load Weight (SLW): Curb weight plus seated load.

Serial Data Signals: A current loop based representation of ASCII or alphanumeric data used for transferring information between devices by transmitting a sequence of individual bits in a prearranged order of significance.

> **NOTE:** An example is the communication that takes place between two or more electronic components with the ability to process and store information.

Special Tools: Tools not normally stocked by the Agency.

Specification: A particular or detailed statement, account or listing of the various elements, materials, dimensions, etc. involved in the manufacturing and construction of a product.

Specific Energy: The amount of energy per unit mass.

Specific Power: The amount of power per unit mass.

Standard: A firm guideline from a consensus group. Standards referenced in “Section 6: Technical Specifications” are the latest revisions unless otherwise stated.

Standee Line: A line marked across the bus aisle to designate the forward area that passengers may not occupy when the bus is moving.

State of Charge (SoC): Quantity of electric energy remaining in the battery relative to the maximum rated amp-hour (Ah) capacity of the battery expressed in a percentage. This is a dynamic measurement used for the energy storage system. A full SoC indicates that the energy storage system cannot accept further charging from the engine-driven generator or the regenerative braking system.

Stress Loops: The "pigtails" commonly used to absorb flexing in piping.

Structure: The basic body, including floor deck material and installation, load-bearing external panels, structural components, axle mounting provisions and suspension beams and attachment points.

Usable Battery Capacity: Usable battery capacity is measured in kWhr and would be the energy available for normal operations. Usable Battery Capacity would be the usable energy from the ESD as managed through the BMX, assumed to be less than the gross capacity. It is calculated based on a useful range of something above 0% SOC and something less than 100% SOC, i.e., as an example, if the range was between 10% and 90% SOC, then the usable battery capacity would be 80% of gross battery capacity.

Warrantable End of Life (WEOL): WEOL is a measure of battery degradation determined as the point at which the batteries can no longer provide the energy or power required to meet the design operating profile. It is expressed as a percentage of remaining battery capacity as compared to gross capacity at the beginning of useful life. For purposes of this specification, WEOL shall be a measure of the useful and intended life of the energy storage device. This measure shall be a percentage of remaining useful capacity based on degradation from the beginning capacity, i.e. kWhr and is used in the overall calculation of mileage range. WEOL shall be used as a condition for battery replacement and to potentially initiate warranty claims.

Wheelchair: A mobility aid belonging to any class of three- or four-wheeled devices, usable indoors, designed for and used by individuals with mobility impairments, whether operated manually or powered. A "common wheelchair" is such a device that does not exceed 30 in. in width and 48 in. in length measured 2 in. above the ground, and does not weigh more than 600 lb when occupied.

Zero-Emission Vehicle (ZEV): A vehicle that emits no tailpipe emissions from the onboard source of power.

TS 3. Referenced Publications

The documents or portions thereof referenced within this specification shall be considered part of the requirements of the specification. The edition indicated for each referenced document is the current edition, as of the date of the issuance of this specification. The Contractor is responsible for complying with current referenced documents.

All schedules, drawings, manufacturing documentation, manuals, parts lists and any other written material or other communication required in the performance of the Contract shall be prepared using the English language as used in the U.S. throughout, so that the documents will be readily understood when in use in the maintenance facilities and by the staff members of transit agencies in the State of Florida. Drawings and diagrams of electrical or electronic circuits shall use symbols and notation as used in the U.S. electronics industry. The English language as used in the U.S. shall be used for all oral, written or other communications.

TS 4. Legal Requirements

The Contractor shall comply with all applicable federal, state and local regulations. These shall include but not be limited to ADA, as well as state and local accessibility, safety and security requirements. Local regulations are defined as those below the state level.

Buses shall meet all applicable FMVSS regulations and shall accommodate all applicable FMCSR regulations in effect at the location of PSTA and the date of manufacture.

In the event of any conflict between the requirements of these specifications and any applicable legal requirement, the legal requirement shall prevail. Technical requirements that exceed the legal requirements are not considered to conflict.

TS 5. Overall Requirements

The Contractor shall ensure that the application and installation of major bus subcomponents and systems are compliant with all such subcomponent vendors' requirements and recommendations. Contractor and Agency shall identify subcomponent vendors that shall submit installation/application approval documents with the completion of a pilot or lead bus. Components used in the vehicle shall be of heavy-duty design and proven in transit service.

At a minimum, the following systems shall be subject to the provision of Contractor review and application approval:

- Energy Storage System
- Axles, suspension, foundation brakes
- Fire Suppression
- HVAC
- Charging System

The Contractor shall not make any substantive or material changes that would differentiate one bus from another bus. If the Contractor identifies a change during the manufacturing process that would materially improve the design, safety and/or performance of the bus, this change must (1) be discussed with PSTA and (2) be considered as a retrofit (if possible) to any previous buses manufactured or assembled. Any such changes must be approved by PSTA in accordance with the communication requirements of this RFP.

In the event of loss of power to the bus, this shall not cause the driver to lose control of the bus or to lose steering or braking. The bus shall be able to be safely brought to a controlled stop.

TS 5.1 Weight

It shall be a design goal to construct each bus as light in weight as possible without degradation of safety, appearance, comfort, traction or performance.

Buses at gross vehicle weight (GVW) shall not exceed the tire factor limits, brake test criteria, structural design criteria or the gross vehicle weight rating (GVWR).

TS 5.2 Capacity

The vehicle shall be designed to carry the gross vehicle weight, which shall not exceed the bus GVWR.

TS 5.3 Service Life

The minimum useful design life of the bus in transit service shall be at least 12 years or 500,000 miles. It shall be capable of operating at least 50,000 miles per year, including the 12th year.

The buses must be able to integrate seamlessly into normal revenue service. The bus must be able to operate on PSTA bus routes, without any interruption in the normal service pattern. The bus must be designed for heavy-duty transit applications.

Normal transit service operation includes, but is not limited to, simultaneously powering all hotel power loads such as HVAC, smart card, destination sign, video surveillance, and multiplexor systems.

The minimum useful life of the charging infrastructure shall be presented in the Proposal.

TS 5.4 Maintenance and Inspection

Scheduled maintenance tasks for buses shall be related and shall be in accordance with the manufacturer's recommended preventive maintenance schedule (along with routine daily service performed during the servicing). The overall PM schedule for buses shall be based upon a minimum of a 6000 mi interval and/or multiples of same.

The Contractor is responsible for providing a written comprehensive 52-week and long-term rehab/replacement maintenance plan encompassing buses for their entire useful life. The plan should include times (in hours) to complete the jobs.

Test ports or connectors, as required, shall be provided for commonly checked functions on the bus, such as hydraulic, pneumatic, cooling, temperature, voltage, current and state of charge (SoC).

The Contractor shall give prime consideration to the routine problems of maintaining the vehicle. All vehicle components and systems, both mechanical and electrical, that will require periodic physical work or inspection processes, shall be installed so that a minimum of time is consumed in gaining access to the critical repair areas. It shall not be necessary to disassemble portions of the bus structure and/or equipment, such as seats and flooring under seats, in order to gain access to these areas. Each bus shall be designed to facilitate the disassembly, reassembly, servicing or maintenance, using tools and equipment that are normally available as standard commercial items.

Requirements for the use of unique specialized tools shall be minimized. The body and structure of the bus shall be designed for ease of maintenance and repair. Individual panels or other equipment that may be damaged in normal service shall be repairable or replaceable. Ease of repair shall be related to the vulnerability of the item to damage in service.

The Contractor shall provide a list of all special tools and pricing for maintaining this equipment as a supplement to the Pricing Schedule.

> **NOTE:** Tools such as compartment door keys, bellows gauges and other tools that are required for daily maintenance and inspection shall not be included in the special tool list and shall be furnished for each bus.

TS 5.5 Maintenance Manuals & Parts Books

For each separately ordered group of buses, the Contractor shall supply detailed and well-organized maintenance manuals and illustrated parts books covering all items on the bus. Hard copies of maintenance and parts

manuals shall be delivered in three ring binders with the sections separated with sturdy plastic divider pages with tabs.

Electronic formats of all manuals will be accepted so long as the materials are organized in similar fashion to their hardcopy counterparts. All information contained in electronic format shall be able to be access through common computer software program in formats that are able to be read and printed.

TS 5.5.1 Operating Manual

The Contractor shall provide operating manuals for each separately ordered group and type of bus delivered. There shall be a separate manual for each type of bus.

The Contractor shall submit drafts of the operating manuals to the Agency for approval early enough to have a final draft on hand when the prototype bus is delivered, and all final copies when the first production bus is delivered.

The operating manual shall cover all operational requirements for the bus driver while in service, but exclude driving skills, rules of the road and interpretation of laws. Information and instructions for all phases of operation shall be provided, including but not limited to bus mechanical operation, response to safety alarm systems, driving operation, lighting system controls, emergency actions, maintenance checks and turning characteristics of the bus.

TS 5.5.2 Operator Training

For each separately ordered group of buses, the Contractor shall provide four (4) hours of training to the Agency's Operations' trainers on driving characteristics of the bus, use of all controls, gauges and warning lamps, driver's seat controls plus other operational items as requested. The Contractor will provide copies of all lesson plans, detailed instructor guides, videos, transparencies, and any other training aids. The Contractor shall identify the instructor and provide the qualifications of the instructor. Dates of the training and timing of deliverables will be determined by the PSTA training staff in coordination with the Contractor. Training and materials must be approved by the Agency.

TS 5.6 Maintenance Manuals

Maintenance manuals shall contain complete data required for preventive and corrective maintenance of all parts of the buses including but not limited to the following:

a) General information and specifications.

b) A complete, well-developed troubleshooting guide covering all the mechanical, electrical and electronic components.

c) All preventive maintenance, lubrication and adjustment requirements.

d) Complete wiring and schematic diagrams and schedules for wire and cable sizes and ratings including actual cable layout, plus locations in the bus of all electrical and electronic components.

e) Illustrative drawings, such as isometrics or exploded views, identifying components in relationship to each other as mounted in the buses.

f) Components shown in exploded views with all parts clearly identified.

g) Rebuilding procedures for all rebuildable components.

h) Detailed, well-illustrated procedures for component change-out plus servicing, adjusting, testing and run-in information as required.

i) A list of all components to be disconnected, plus the specific terminations to disconnect, when electric welding is performed on the bus.

j) Body and structural information and material specifications for major accident repairs. The Agency will accept vendor proprietary information on a timely, as needed basis.

k) Seating and stanchion layouts and window diagrams (may be included in parts manual).

l) Repair and calibration instructions and values.

m) List of special test equipment/tools required to maintain and repair systems down to the component level.

n) Software information, including source codes for any programmed module or component, information on programmed array logic (PAL) and any other programmed device.

o) Complete schematic drawings containing component identification and the location of components on the circuit board; circuit descriptions and theory of operation for all electronic components.

PSTA prefers that the Contractor's maintenance manual thoroughly describe the maintenance of all parts of the bus.

Realizing that some specialized OEM manuals will be provided, the Agency requires that the Contractor provide the following OEM vendor manuals and publications:

1) Bus electrical wiring diagrams.
2) Electrical system diagnostic and troubleshooting guides.
3) Electronic data control troubleshooting manuals.
4) Propulsion system service, troubleshooting, and overhaul manuals.
5) Transmission service, troubleshooting, and overhaul manuals.
6) HVAC system service, troubleshooting, and overhaul manuals.
7) Air system diagnostic and troubleshooting guides.
8) Comprehensive color-coded air system schematics.
9) Foundation brake system analysis and troubleshooting guides.
10) Anti-Lock Brake (ABS) and Automatic Traction Control (ATC) system service, troubleshooting, and overhaul manuals.
11) Differential and drive shaft service, troubleshooting, and overhaul manuals.

12) Steering column service, troubleshooting, and overhaul manuals.
13) Steering gear service, troubleshooting, and overhaul manuals.
14) Wheelchair ramp system service, troubleshooting, and overhaul manuals.
15) Fire suppression system service, troubleshooting, and overhaul manuals.

TS 5.7 Parts Manuals

Illustrated parts books shall contain exploded views that show all parts used on buses built under this Contract, and no other parts. The exploded views will show all fasteners and miscellaneous hardware. The books shall contain data arranged so that part numbers can be readily found and identified in the illustration for each system and subsystem component, assembly, sub-assembly or piece part from an orderly breakdown of the complete bus. It shall contain a ready reference part number index and part name index and be sufficiently well illustrated to identify items requiring repair, replacement and storage for use in the maintenance of the buses.

All sub-assemblies (such as wiper motor, starter motor, etc.) preferably shall have the original manufacturer's part number displayed at the beginning of the appropriate parts listing section.

Lists shall include at least the following information for all parts:

- Generic description and specifications.
- Contractor part number.
- Brand name, where applicable.
- Original manufacturer's part number (preferred).
- Indication if the part is custom manufactured only on request.
- Standard hardware described by size, type, material and grade.

It is preferred that the parts manual shall include all original manufacturer names and addresses. The parts manual shall include all special tools, test and diagnostic equipment supplied by the Contractor.

TS 5.8 Interchangeability

Unless otherwise agreed, all units and components procured under this Contract, whether provided by Suppliers or manufactured by the Contractor, shall be duplicates in design, manufacture and installation to ensure interchangeability among buses in each order group in this procurement. This interchangeability shall extend to the individual components, as well as to their locations in the buses. These components shall include, but are not limited to, passenger window hardware, interior trim, lamps, lamp lenses and seat assemblies. Components with non-identical functions shall not be, or appear to be, interchangeable.

Any one component or unit used in the construction of these buses shall be an exact duplicate in design, manufacture and assembly for each bus in each order group in this Contract. Contractor shall identify and secure approval for any changes in components or unit construction provided within a Contract.

In the event that the Contractor is unable to comply with the interchangeability requirement, the Contractor must notify the Agency and obtain the Agency’s prior written approval, including any changes in pricing.

Agency shall review proposed product changes on a case-by-case basis and shall have the right to require extended warranties to ensure that product changes perform at least as well as the originally supplied products.

TS 5.9 Training

For each separately ordered group, or requirement, of buses, the Contractor shall provide a program of instruction, instructional materials, and training aids targeted for vehicle maintenance personnel. The timing of the maintenance training, constitution of the groups to be trained, delivery of the specified training aids, and specified equipment will be coordinated with the Agency.

The Contractor shall provide to the Agency copies of all lesson plans, detailed instructor guides for each training program, student workbooks, manuals, publications, videos, transparencies, and any other training aids used by an instructor when teaching a course 90 days prior to the delivery of the first production bus. The Contractor shall identify the instructors and provide the qualifications of the instructors. The Contractor shall inform the Agency of any training support equipment and/or supplies required of the Agency for the Contractor portion of the training.

The Contractor will designate a specific individual as the "Principal Training Contact" for the scheduling and accomplishment of the Contractor and vendor training. The Contractor will provide a name, complete mailing address, telephone number, and fax number for this person to the Agency not later than 90 days after Notice to Proceed.
If the Agency so requests the Contractor shall have at least one qualified instructor who shall be available at the Agency's property for no less than seven (7) calendar days, at hours convenient to the Agency, after delivery and acceptance of the first bus. Instructor(s) shall conduct schools and advise the personnel of the Agency on the proper operation and maintenance of the equipment. The Contractor also shall provide visual and other teaching aids (such as manuals, slide presentations and literature) for use by the Agency's own training staff, which become the property of the Agency.

TS 5.9.1 Technical/Service Representatives

The Contractor shall, at its own expense, have one or more competent technical service representatives available on request to assist the Agency in the solution of engineering or design problems within the scope of Services and the specifications that may arise during the warranty period. This does not relieve the Contractor of responsibilities under the provisions of "Section 7: Warranty Requirements."

The Contractor shall provide full-time, on-site technical support representative for the buses and charging and associated equipment for the first two (2) years after bus delivery, with annual renewal options for ten (10) more years.

TS 5.10 Operating Environment

The bus shall achieve normal operation in ambient temperature ranges of 30 ºF to 120 ºF, at relative humidity between 5 percent and 100 percent, and at altitudes up to 11 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 30 °F, above 120 °F or at altitudes above 11 feet.

TS 5.11 Noise

The Contractor is expected to meet interior and exterior noise requirements specified in Section 5.11.1 and Section 5.11.2, respectively. Furthermore, it shall be a design goal to minimize noise. Component layout and packaging, material selection and build quality shall reflect that goal.

TS 5.11.1 Interior Noise

The combination of inner and outer panels and any material used between them shall provide sufficient sound insulation so that a sound source with a level of 80 dBA measured at the outside skin of the bus shall have a

sound level of 65 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the propulsion/drive system and accessories switched off.

Maximum internal noise level shall not exceed 75 dBA in the operator's area near normal operator ear level and 80 dBA in all other areas in the interior of the vehicles under all normal operating conditions at locations inside the bus in adherence with the standards of ISO 5128.

TS 5.11.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 80 dBA under full-power acceleration when operated at 0 to 35 mph at curb weight. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the Agency and SAE J366.

NOTE: Additional requirements appear in Section TS 63, "Pedestrian Safety."

TS 5.12 Fire Safety

The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emission regulations.

TS 5.12.1 Materials

All materials used in the construction of the passenger compartment of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FMVSS 302.

The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emission regulations. These provisions shall include the use of fire-retardant/low-smoke materials, fire detection systems, bulkheads and facilitation of passenger evacuation.

Provide a fully automatic fire detection system that shall detect fires in the propulsion system compartment and house batteries of the bus. The system shall detect conditions that lead to, or are the result of fire and/or smoke in the energy storage system compartment(s) and display appropriate warning lights to the driver. The system shall be capable of event logging, data monitoring, communication to multiplex vehicle networks via I/O or relay switching, and providing trouble indications for all inputs and outputs. Operator/fault messages shall be displayed via text messages on an operator display panel. Provide a supplemental manual actuator in the driver's station. Provide appropriate status and warning lights on the driver's dash and an audible fire detection warning. The system shall be unaffected by propulsion system compartment cleaning with high-pressure hot water ("steam cleaning"). System shall be as maintenance-free as possible. Access panel(s) shall be provided, as necessary, to allow reading the gauges on the fire suppression bottles and to easily remove and replace the bottles.

Materials entirely enclosed from the passenger compartment, such as insulation within the sidewalls and sub-floor, need not comply. In addition, smaller components and items, such as seat grab rails, switch knobs, small light lenses, door seals, window seals, steering wheel, steering column and escape hatches shall be exempt from this requirement.

TS 5.13 Fire Suppression

Fire Suppression/Gas Detection

The buses shall be equipped with a suitable means of automatically detecting and extinguishing fires and/or overtemperature situations that may cause unreliable or unsafe operation. If the energy storage device is capable of releasing combustible gas, then this same system shall incorporate an integrated gas detection and alarm feature. This system shall employ intrinsically safe detectors capable of reliable operation, alert and shutdown to ensure safe operation. Alert shall occur at approximately 25 percent lower flammability limit (LFL), and shutdown shall occur at approximately 50 percent LFL. This system shall include an uninterruptable power supply (UPS) capable of sustaining operation for a period of at least 72 h regardless of the primary energy source SoC and remain uninterrupted regardless of "run"/"ign" position. The quantity, location and technology for sensors, suppression, agents, etc. shall be best practice for the intended application and environment. Sensors shall be of the linear type, capable of measuring temperature and programmable at the controller. Fire suppression piping located in the immediate area(s) being protected shall be fireproof and capable of surviving gross thermal events. The subject piping shall include the flow path between the fire suppression bottle and nozzles, metalized rigid/flexible, stainless steel preferred. The system shall include a means to automatically monitor fire suppression storage container pressure and provide low-pressure alerts to the integrated system controller/display.

TS 5.14 Respect for the Environment

In the design and manufacture of the bus, the Contractor shall make every effort to reduce the amount of potentially hazardous waste. In accordance with Section 6002 of the Resource Conservation and Recovery Act, the Contractor shall use, whenever possible and allowed by the specifications, recycled materials in the manufacture of the bus.

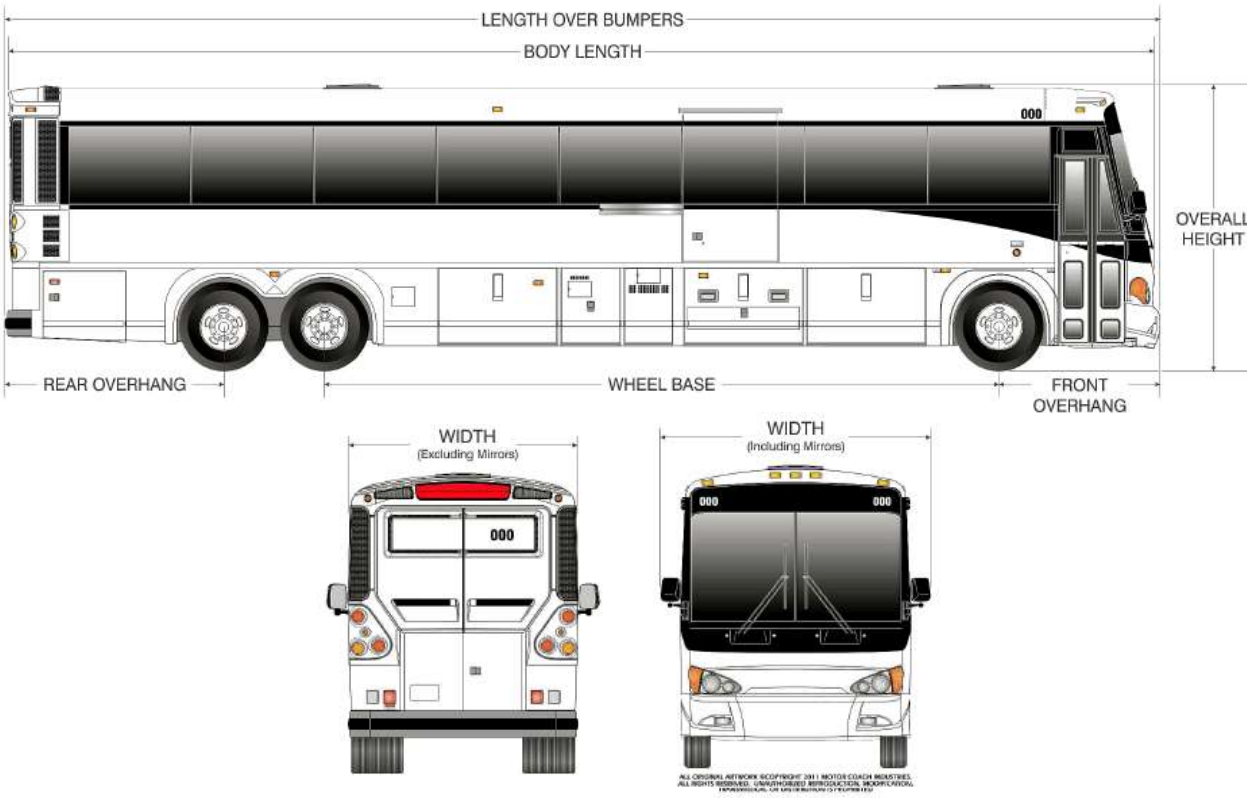
The Contractor shall provide a plan for reuse or recycling of replaced battery cells and/or battery packs.

DIMENSIONS

TS 6. Physical Size

With exceptions such as exterior mirrors, marker and signal lights, bumpers, fender skirts, washers, wipers, ad frames, cameras, object detection systems, bicycle racks, feelers and rubrails, the bus shall have the following overall dimensions as shown in **Figure 1** at static conditions and design height.

FIGURE 1
Transit Bus Exterior Dimensions



TS 6.1 Bus Length

For ease of use, the following tolerances will be allowable for each given bus length. Bus length is determined as the measurement from bumper to bumper.

- **29 ft / 30 ft bus:** 29 ft to 34 ft, 11 in.
- **35 ft bus:** 35 ft to 39 ft, 11 in.
- **40 ft bus:** 40 ft to 44 ft, 11 in.
- **45 ft bus:** 45 to 47 ft
- **60 ft (articulated) bus:** 59 to 65 ft

TS 6.2 Bus Width

TS 6.2.1 Transit Coach

DEFAULT

102 in. Width Bus

Body width shall be 102 in. (+0, -1 in.).

TS 6.2.2 Commuter Coach

DEFAULT

102 in. Width Bus

Body width shall be 102 in. (+0, -1 in.).

TS 6.3 Bus Height

DEFAULT

Maximum Overall Height

Maximum overall height shall be 144 in., including all rigid, roof-mounted items such as A/C, exhaust, fuel system and cover, etc.

TS 6.4 Step Height

TS 6.4.1 Transit Coach

The step height shall not exceed 16.5 in. at either doorway without kneeling and shall not exceed 15.5 in. at the step. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 6.4.2 Commuter Coach

The step height shall not exceed 16.5 in. at doorway without kneeling and shall not exceed 15.5 in. at the step.

TS 6.4.3 Articulated Coach

The center door on an articulated bus shall have no steps.

TS 6.5 Underbody Clearance

The bus shall maintain the minimum clearance dimensions as defined and shown in Figure 2 of SAE J689, regardless of load up to the gross vehicle weight rating.

TS 6.6 Ramp Clearances

The approach angle is the angle measured between a line tangent to the front tire static loaded radius arc and the initial point of structural interference forward of the front tire to the ground.

The departure angle is the angle measured between a line tangent to the rear tire static loaded radius arc and the initial point of structural interference rearward of the rear tire to the ground.

The breakover angle is the angle measured between two lines tangent to the front and rear tire static loaded radius and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll.

DEFAULT

Refer to **Table 2a**.

TABLE 2a

Default Breakover Angle

Angle	30 to 45 ft Bus	60 ft Bus
Approach	8.6 deg (min.)	8.6 deg (min.)
Front breakover	8 deg (min.)	10.2 deg (min.)
Rear breakover (articulated only)	n/a	8.7 deg (min.)
Departure	8.6 deg (min.)	8.6 deg (min.)

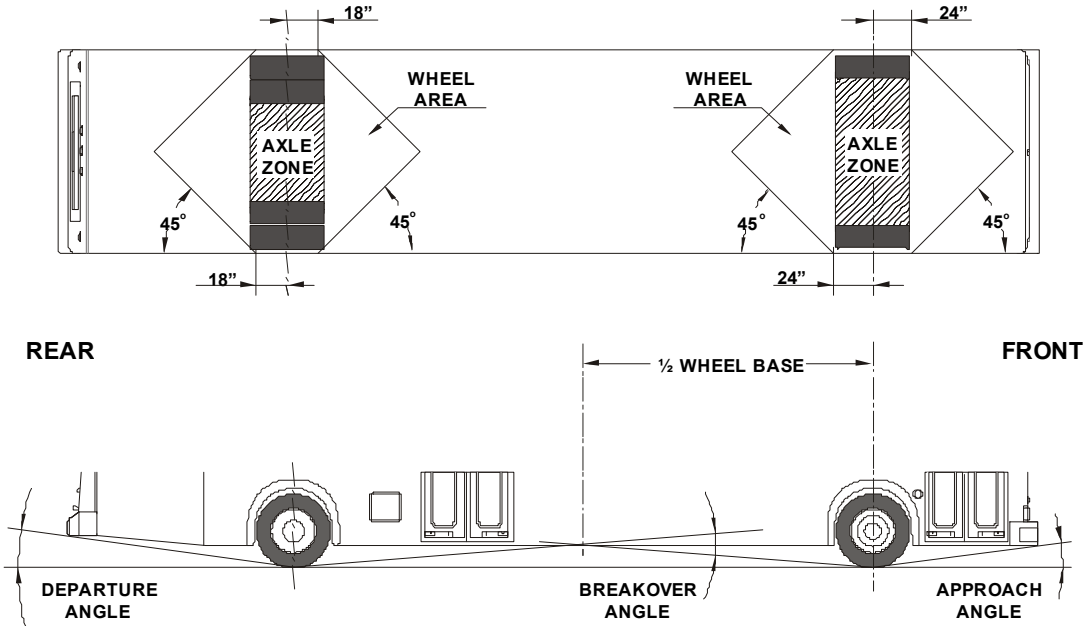
TS 6.7 Ground Clearance

Ground clearance shall be no less than 9 in., (8 in. at jacking pad) except within the axle zone and wheel area.

Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5.4 in.

Wheel area clearance shall be no less than 8 in. for parts fixed to the bus body and 6 in. for parts that move vertically with the axles.

FIGURE 2
Transit Bus Minimum Road Clearance



TS 6.8 Floor Height

TS 6.8.1 Transit Coach

Height of the step above the street shall be no more than 16 in. measured at the centerline of the front and rear doorway. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 6.8.2 Commuter Coach

Height of the step above the street shall be no more than 16 in. measured at the centerline of the doorway. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires.

TS 6.9 Interior Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 in. in the forward half of the bus, tapering to no less than 74 in. forward of the rear settee. At the centerline of the window seats, headroom shall be no lower than 65 in., except for parcel racks and reading lights, if specified. Headroom at

the back of the rear bench seat may be reduced to a minimum of 56 in., but it shall increase to the ceiling height at the front of the seat cushion. In any area of the bus directly over the head of a seated passenger and positioned where a passenger entering or leaving the seat is prone to strike his or her head, padding shall be provided on the overhead paneling.

VEHICLE PERFORMANCE

TS 7. Power Requirements

The system shall be sized to provide sufficient power to enable the bus to meet the defined acceleration, top speed, route, mileage, GVWR and gradeability requirements, while operating all accessories. This shall be verified using actual road test results and/or simulated vehicle performance data.

A loss of power to the bus shall not cause the driver to lose control of the bus or to lose steering or braking. The bus shall be able to be safely brought to a controlled stop.

Performance Information/Graphs to be include with Proposal submittal shall include:

- Energy Consumption vs. Road Speed
- Torque vs. Road Speed
- Energy consumption vs. torque.
- Vehicle speed vs. time (both loaded and unloaded)
- Vehicle speed vs. grade (both loaded and unloaded)
- Acceleration vs. time
- Change of acceleration vs. time

TS 7.1 Top Speed

DEFAULT

The bus shall be capable of achieving a top speed of 65 mph on a straight, level road at GVWR with all accessories operating. The bus shall be capable of safely maintaining the vehicle speed according to the recommendations by the tire manufacturer. Manufacturer shall supply Agency with data if there is a variance between peak performance and sustained vehicle performance.

TS 7.2 Gradeability

Gradeability requirements shall be met on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating.

DEFAULT

The propulsion system shall enable the bus to achieve and maintain a speed of 40 mph on a 2.5 percent ascending grade and 10 mph on a 10 percent ascending grade continuous.

> **NOTE:** Values are assumed to be sustained. Manufacturer shall supply Agency with data if there is a variance between peak performance and sustained vehicle performance.

TS 7.3 Acceleration

The acceleration shall meet the requirements in **Table 3** and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement shall commence when the accelerator is depressed.

TABLE 3
Maximum Start Acceleration Times on a Level Surface[1]

Speed (mph)	Maximum time (seconds)
10	5
20	10
30	18
40	30
50	60
Top speed	Contractor to State

1. Vehicle weight = GVWR

NOTE: The system shall be programmable to allow optimization of acceleration. Performance may be affected when reprogramming. The manufacturer shall supply the new performance data.

The propulsion and braking systems shall meet the performance requirements of the duty cycle.

Braking application and performance shall remain consistent regardless of system state of charge (SOC) or other variances related to regenerative braking.

The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming. The manufacturer shall supply the new performance data.

The Contractor shall provide performance scans to the Agency based on the Agency's specific drivetrain configuration.

TS 7.4 Operating Range

The operating range of the coach shall be designed to meet the operating profile as stated in the "Design Operating Profile" section.

The operating range of the coach on a single battery charge shall be designed to meet the following targeted ranges per the operating profiles as stated in the "Design Operating Profile" section.

TS 8. Range (Design Operating Profile)

The bus must be able to achieve operational requirements under standard operating conditions and in agency-specific conditions. These conditions make up the Design Operating Profile. The standard operating conditions are defined by the Bus Research Testing Center at Altoona, Pennsylvania ("Altoona") and are used as a benchmark and as a means to compare the performance of various buses across a set standard. The

agency-specific conditions are established to ensure that the buses will be able to meet the unique operational requirements of the transit agency.

TS 8.1 Altoona Energy Consumption Tests

The Altoona On-Road Energy Consumption and Range Test for buses is based on a Transit Coach Operating Duty Cycle (ADB cycle) and includes a mix of central business district (CBD), arterial (ART) and commuter (COM) cycles. Test results from the ADB cycle economy tests or other applicable test procedures shall be provided to the Agency. Results shall include vehicle configuration and test environment information. Energy consumption data shall be provided for each duty cycle.

TS 8.1.1 29/30 FT Transit Coach

The OEM shall state the operating range of the coach when run under the following operating duty cycles:

Duty Cycle	Energy Consumption (kWh/mi)	Nominal Range (miles)
Central Business District (CBD)		
Arterial (ART)		
Commuter (COM)		

TS 8.1.2 35 FT Transit Coach

The OEM shall state the operating range of the coach when run under the following operating duty cycles:

Duty Cycle	Energy Consumption (kWh/mi)	Nominal Range (miles)
Central Business District (CBD)		
Arterial (ART)		
Commuter (COM)		

TS 8.1.3 40 FT Transit Coach

The OEM shall state the operating range of the coach when run under the following operating duty cycles:

Duty Cycle	Energy Consumption (kWh/mi)	Nominal Range (miles)
Central Business District (CBD)		
Arterial (ART)		
Commuter (COM)		

TS 8.1.4 45 FT Commuter Coach

The OEM shall state the operating range of the coach when run under the following operating duty cycles:

Duty Cycle	Energy Consumption (kWh/mi)	Nominal Range (miles)
Central Business District (CBD)		
Arterial (ART)		
Commuter (COM)		

TS 8.1.5 60 FT Articulated Bus

The OEM shall state the operating range of the coach when run under the following operating duty cycles:

Duty Cycle	Energy Consumption (kWh/mi)	Nominal Range (miles)
Central Business District (CBD)		
Arterial (ART)		
Commuter (COM)		

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TS 8.2 Design Operating Profile (Battery Electric Bus)

The Proposer must validate that the proposed bus will meet the design operating profile using sound mathematical modeling and simulation or empirical methods. Proposers must demonstrate the agreement of the mathematical models against Altoona results using ADB cycle data. The profile must be met under maximum auxiliary loads and at GVWR. It is assumed that buses will start daily duty cycle at maximum standard operating SoC. Batteries shall not be depleted below minimum standard operating SoC during operations. Minimum standard operating SoC shall allow for reserve battery capacity from which the bus can draw upon to return to the closest charging point in degraded mode. Charging of the batteries during normal operations shall not exceed maximum standard operating SoC at any time during charging.

The route model data provided may be used as an approximation of the actual route for modeling purposes only.

Supply a computer simulation of bus performance, utilizing the physical and mechanical characteristics of a specific bus, for each type of bus offered. Performance simulation data to be prepared with 130% passenger load and all accessories on. Supply a performance summary for the exact bus(es) to be built, utilizing a 130% passenger load. Data to show AT LEAST the following: time to speed on flat ground, 5%, 7%, 10% and maximum grade for speeds of 5, 10, 15, 25, 35 mph (or maximum for each grade). Describe to what extent and in what manner software controlled load shedding will be utilized to achieve the desired performance. Include a list of parameter set points that can be adjusted to suite operating environment and performance requirements of transit buses in the State of Florida.

Nominal conditions

- **Ambient temperature:** 90 °F
- **Bus weight:** SLW

Worst-case conditions

- **Ambient temperature:** Worst-case heating and cooling loads when operating in State of Florida environmental conditions as defined by NOAA.com, or other website.
- **Bus weight:** GVWR

The Contractor shall provide the following narratives with its Technical Proposal:

- Narrative description of the methods used to validate that the proposed system will meet the Agency design operating profile under nominal and worst-case conditions. Detailed results should include, at a minimum, the following for both nominal and worst-case conditions:
    - expected bus range (miles)
    - fuel economy (kWh/mile); and
    - auxiliary loads (kW).
- Projected performance on the Agency design operating profile when the battery reaches end-of-life (EOL) state. The Proposer will provide specific details on EOL criteria. Detailed results should include, at a minimum, the following: expected battery life from factory delivery under normal operating conditions (months), EOL battery capacity (kWh), EOL bus range (miles).
- Description of any required or recommended charge strategies or other bus operation strategies that are necessary to meet the Agency design operating profile. Note that the agency requires that operational impacts be minimized.
- Description of the flexibility and considerations necessary to place the proposed bus and its charging solution on any Agency route at the Agency's discretion.
- Description of any required charge strategies, on-route charge requirements, bus blocking requirements or other bus operational requirements that are necessary to meet the Agency design operating profile. Note that the agency requires that operational impacts be minimized.
- Description of the flexibility and considerations necessary to place the proposed bus and its charging solution on any Agency route at the Agency's discretion.

POWERPLANT

TS 9. Electric Propulsion System

TS 9.1 Propulsion System - All Electric

TS 9.1.1 Propulsion System Description

The bus shall be powered by an electric propulsion system. To the greatest extent practical, the electric propulsion system shall conform to SAE J2910 and SAE J2344.

The propulsion system shall not be supplemented by any onboard range extenders, including but not limited to internal combustion engines, gas turbines and/or hydrogen fuel cells.

The OEM shall ensure that the bus structure is suitable for the electric propulsion system and can be operated safely on the Design Operating Profile (TS 8) for the service life of the bus (TS 5.3) without a structural failure. The propulsion system shall comply with applicable local, state and/or federal useful life requirements.

Labels should be posted on high-voltage devices to identify them as components conducting high voltage potential.

A detailed description of the propulsion system shall be provided with the Proposal. The description shall include a written narrative, a block diagram showing major propulsion system components, an illustration showing the physical layout of propulsion components and high-voltage wire routing within the vehicle, and a detailed wiring diagram and/or electrical schematic for the high-voltage system. Proposer is required to provide a list of applicable industry standards that the proposed propulsion system meets.

TS 9.1.2 Propulsion System Service

The propulsion system shall be arranged so that accessibility for all routine maintenance is ensured. No special tools, other than dollies and hoists, shall be required to remove the propulsion system or any subsystems. The Agency recognizes that properly rated test equipment and safe electrical work practices are essential when servicing high-voltage components. The Contractor shall identify safe electrical work practices that are essential when servicing high-voltage components. The Contractor shall provide all specialty tools and diagnostic equipment required for maintaining the propulsion system in accordance with the Special Tools List.

TS 9.1.3 Primary Propulsion Unit and Traction Motor(s)

The propulsion system components may be arranged in a variety of configurations. The traction motor must be capable of providing and retarding mechanical motion.

The propulsion and braking systems shall meet the performance requirement of the Duty Cycle. Braking application and performance shall remain consistent regardless of the System State of Charge (SOC) or other variances related to regenerative braking. The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming. The manufacturer shall supply the new performance data. In addition to power required for propulsion, sufficient excess power shall be available to operate all accessories at their normal operating condition throughout the transit bus duty cycle.

The propulsion system shall be designed so that no component operates at more than 80% of its maximum designed load, speed,, voltage or amperage. A programmable system shall be provided to limit motor speed to a safe value. Propulsion system operation, including charging of the energy storage system, shall be electronically controlled. It shall have a programmable performance control system and the latest maintenance and diagnostic software system. PSTA will be granted access to full re-programming functionality to all components of the vehicle.

TS 9.1.4 Energy Storage System and Controller

Energy Storage System

The Energy Storage System (ESS) shall be of a commercial design capable of operating in the Agency transit environment and design operating profile. The ESS shall use battery technology with a field-proven track record of safe, reliable and durable operation in similar traction applications. The ESS shall be designed, sized and selected to ensure that the vehicle performance specifications, compatibility with charging, and other related requirements are met or exceeded, bearing in mind cost/benefit and reliability variables as they relate to the characteristics of the different battery types.

The ESS shall comply with UN/DOT 38.3 and/or SAE J2464 requirements for lithium batteries or similar standards for non-lithium batteries.

The Contractor shall deliver the buses with an installed, fully charged, functioning ESS. The ESS shall be fully formed, installed and tested in accordance with the battery manufacturer's recommended practices. The ESS design, including containers, module bracing systems, thermal-management systems, battery-management systems, watering/venting systems, interconnections, fusing and traction-controller and charger interfaces shall be adequately described in the Proposal. The Proposal shall include a description of all battery maintenance requirements including any periodic charge requirements necessary for cell balancing.

The Proposal shall include a detailed analysis of expected battery performance in the Design Operating Profile.

The Proposal shall also include a comprehensive statement of the warranty terms relating to the battery, including explanation of all disclaimers within the warranty. The charge cycle and cycle life shall be stated in the proposal, and a life-cycle cost analysis of the proposed battery system in the specified application shall be provided.

The battery system shall be capable of withstanding the current and voltage profiles necessary to accomplish daily recharge events within the defined operating profile.

Thermal management will be provided as needed to ensure optimal life and performance of the ESS over the environmental operating range. The battery thermal management system shall be adequate to maintain the battery within the battery manufacturer's recommended temperature range during operation in the specified duty cycle and climatic conditions.

If the ESS running a low SOC will in any way damage the ESS and/or the propulsion system, the propulsion system manufacturer together with the Contractor shall provide sufficient warning to the operator. An approved system shutdown may be used. A phased automatic shutdown system shall be provided.

Proposals shall include complete descriptions of all life-cycle testing procedures used to validate the life of batteries used for this application at the proposed charging rates, charge durations, and expected ambient temperatures and operating profiles. Proposers shall include documented results of life-cycle testing.

Proposers shall include certification of battery life-cycle testing by an independent testing agency.

Energy Storage System Capacity

The ESS shall have sufficient energy storage to meet the requirements of the intended duty cycle when new and up until the degradation has reached warrantable end of life (WEOL), as defined within the warranty terms of this RFP by percent remaining capacity. As an example if the capacity when new is 300 kWh and the WEOL is at 80 percent, then the useable capacity range shall be from 300 to 240 kWh.

Energy Storage System Safety

The ESS shall be placed on the bus to optimize both interior space and vehicle weight distribution. The batteries shall be load distributed within the bus to equalize weight between the wheels on the same axles and to achieve appropriate weight distribution between axles so as not to adversely affect handling of the bus.

The bus body shall be designed and constructed to ensure that passengers and the operator will not be exposed to hazardous electrical current. This design will also minimize potential exposure to hazardous electrical current in the event of a vehicle accident. Analysis and test data shall be provided to the Agency. The vehicle and energy storage system shall be designed and constructed to prevent gassing or fumes from the energy storage system from entering the interior of the bus, i.e., a vent path to the exterior, preferably at or above the roof, rearward.

Written confirmation from the battery manufacturer attesting to the safety of the proposed battery system in the specified application and charging profile shall be submitted as part of the proposal, and shall include full disclosure and discussion of any and all relevant issues or prior incidents relating to safety.

Proposals shall include complete descriptions of all safety standards followed in the design and manufacture of the battery system, safety testing procedures used to validate the safety of battery operation in this application, and documented results of safety testing to confirm that standards have been met.

Both automatic and manual battery disconnect devices must be included and documented. Contactors shall be rated to interrupt the full load of the bus. Service and emergency manual disconnects must be included and their usage documented. Contractor shall provide a means to isolate the high-voltage battery during maintenance operations. Manual and automatic disconnects should open both poles of each physical battery pack.

The HV and ESS shall include isolation protection between the HV and bus chassis system, to include automatic detection of isolation faults, alerts to the operator, diagnostic system and appropriate action to prevent personnel from HV exposure.

The system described above may also be an integral part of the overall emergency shutdown system, with functions to include the following:

- Offers a quick, safe and organized means for the operator, maintenance personnel and/or first responders to shut down the HV system.
- Shutting down the system shall include at least:
    - "opening" all HV contactors;
    - discharging capacitors (if used); and
    - disconnecting any devices that could provide HV, during normal operation and including during charging.
- Devices used to initiate shutdown shall be located within and outside the bus to satisfy ease of use by the mentioned personnel and be clearly marked as to location and use.
- In addition to manual use, this same functionality shall extend to the charging operation in the event of a fault sensed by the GFI, to also include termination of charge.

Battery Containers

Battery containers shall be constructed to withstand the rigors of transit service for the design life of the buses. Construction shall be of materials compatible with the battery electrolyte. All electrical connections shall be fully shielded and hand-operable. Connector and cabling design shall be such that inappropriate or unsafe connections are unlikely. Vent-and-fill system components for individual packs or containers shall not require any disassembly on removal or installation of the battery packs or containers. Pack design must comprehend the protection of battery cabling and vent/watering system components during pack removal and installation. The batteries, when installed, shall be secured to the chassis to prevent any movement that may cause damage or personal harm while the vehicle is in operation.

Battery Management System

The battery management system must be designed to ISO 26262 safety principles to control state of charge, voltage, current and temperatures on a cell-to-cell level and provide diagnostic output at the lowest field-serviceable element. The diagnostic output must be made available to the maintainer.

As a minimum, the battery management system (BMS) must perform the following functions:

1. The BMS must be capable of monitoring the voltage of cells within each battery pack. The BMS must be able to read individual battery or block voltages at a frequency of one data point per block every 15 seconds.
2. The BMS must be capable of monitoring battery temperatures, mitigating damage to the battery and surroundings, and preventing thermal runaway.

3. The BMS must be capable of communicating when a battery fault (as defined by the battery manufacturer) has occurred and must be able to identify and communicate the location of the faulty battery in order to perform maintenance.
4. The BMS must be capable of engaging prudent safety interlocks when an unsafe battery condition has been detected.
5. The BMS must be able to monitor the battery SoC and provide information to the rest of the vehicle.
6. The BMS must be able to communicate all data to the bus level information system (reference TS 84) for storage and communication.

Battery Thermal Management

Thermal management shall be provided to ensure optimal life and performance of the ESS over the environmental operating range.

Battery temperatures must never exceed the manufacturer's recommended range during operation in the design operating profile and specified ambient conditions. Battery cooling must be sufficient to prevent the temperature from exceeding the battery manufacturer's recommended maximum temperature.

Battery Charging

The bus shall support an SAE-approved charging standard (SAE J3068 AC and/or SAE J1772 DC). Manufacturer shall provide a detailed description of its charging system and specify its compliance with one of the above-listed standards. Proposers shall include a description of the charging infrastructure required to install and operate the charging equipment.

All charging systems provided for use with the bus and in conjunction with the battery management system must comply with the battery manufacturer's electrical and thermal limits.

The buses must be immobilized during all charging operations. Upon successful engagement of the charging interface, the bus shall be interlocked such that propulsion is rendered inoperable and the brakes applied.

The buses shall include a charging receptacle located either streetside front, streetside rear, or curbside rear. The charging receptacle shall be at the manufacturers standard mounting location. Proposer should indicate where their standard mounting is located. If the mounting location is customizable, meaning the Agency has a choice, the Proposer should so indicate in their Proposal response. If the Proposer allows more than one charging receptacle to be installed on the bus then the Proposer shall also indicate in their Proposal response.

Charging

The bus shall support an SAE-approved charging standard. Proposers shall include a detailed description of their charging system and specify its compliance with one of the above-listed standards. Proposers shall include a description of the charging infrastructure required to charge the bus on route and/or at the depot.

TS 9.1.5 Propulsion System Controller (PSC)

The PSC regulates energy flow throughout system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (voltages, currents, temperatures, etc.) within specified operating ranges.

The controller shall monitor and process inputs and execute outputs as appropriate to control the operation of all propulsion system components.

Energy storage system SoC correction methods stated in SAE J2711 shall be used (for hybrid only).

TS 9.1.6 Hybrid System Controller (HSC)

The HSC regulates energy flow throughout hybrid system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (e.g., voltages, currents, temperatures, etc.) within specified operating ranges.

The controller shall monitor and process inputs and execute outputs as appropriate to control the operation of all propulsion system components.

Energy storage system SoC correction methods stated in SAE J2711 shall be used.

TS 10. Cooling Systems

The capacity of the cooling system shall be adequate to maintain design component temperatures under all operating conditions for the design life of the vehicle in the service area and environment of the agency. The Contractor shall provide evidence that the cooling system selected has the capability to handle peak heat rejection from the traction motor, energy storage system, propulsion control system, and the intermediate and low-voltage power supply with a partially clogged radiator at maximum ambient temperature plus heat reflected off the pavement. The Contractor shall submit an analysis verifying cooling system capabilities. The entire cooling system shall be equipped with an electronic detection device to indicate overheating on the driver's control panel.

The cooling systems shall be of sufficient size to maintain all continuous operating temperatures during the most severe operations possible and in accordance with manufacturers' cooling system requirements. The cooling system fan controls should sense the temperatures of the operating fluids and the intake air, and if either is above safe operating conditions, the cooling fan should be engaged. The fan control system shall be designed with a fail-safe mode of "fan on." The cooling system shall meet the requirements stated in the operating environment.

Operation of required battery thermal management systems shall be automatically controlled under all normally encountered operating and charging conditions and shall be powered by an onboard source at all times. Thermal management shall be continuously monitored during all periods of charge and discharge with appropriate safety interlocks installed to react to adverse conditions.

Air intakes shall be properly positioned and configured to minimize the intake of water, road dust and debris and shall be adequately filtered.

In the event of a failure of the battery thermal management system while charging, the charge system shall be disabled and a visual alert shall be activated on the dashboard, the reset of which shall require the deliberate action of maintenance personnel. In the event of a failure of the battery thermal management system during bus operation, an audible and visual alert shall be activated on the dashboard, the reset of which shall require the deliberate action of maintenance personnel. In the event of a fire onboard a bus, thermal management fans shall be automatically turned off.

A complete description of the battery thermal management systems shall accompany the bid package. Written confirmation from the battery manufacturer attesting to the suitability of the battery thermal management system shall be submitted to the Agency concurrent with or prior to delivery of the first bus.

The cooling system shall meet the requirements stated in Operating Environment above.

The cooling system is assumed for all temperature control required for the propulsion system, heating and/or cooling, further assuming that heat from this system will also be used to provide thermal energy as required for vehicle functions, as HVAC and defroster.

TS 10.1 Component Thermal Management

Under the vehicle operating temperature range, the thermal management system shall be designed such that each component will remain in its allowed operating range.

Component temperature sensors may be used for monitoring, control or component/system protection. If equipped and serviceable, component temperature sensors shall be easily accessible. Under typical failure modes or out-of-limit conditions, component temperature sensors shall not disable the bus unless there is an immediate risk of hazardous fault propagation (e.g., temperature levels in the motor area known to start fires). In the event that a component temperature sensor must disable the bus, the component/system must comply with the automatic propulsion system protection/shutdown override feature requirement of TS 9.

Motor cooling fans shall be of durable, corrosion-resistant construction and designed so a mechanic can gain access. The cooling fan and mounting bracket shall be designed to withstand the thermal fatigue and vibration associated with the installed configuration.

A means of determining satisfactory component coolant level shall be provided. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system with both it and the water filler no more than ±60 in. above the ground. Both shall be accessible through the same access door.

The radiator shall be of durable, corrosion-resistant construction with non-removable tanks.

For roof mounted radiators, a pressure filler will be provided in the engine compartment no more than ±60 in. above the ground.

TS 10.1.1 Radiator Screen

The radiator input shall be protected by an easily cleanable screen designed to collect large debris. The radiator cores shall be easily cleaned with standard pressure-washing equipment.

TS 10.1.2 Coolant

Coolant Filtration Without Supplemental Additives

The cooling system shall be equipped with a properly sized water filter with a spin-on element. The filter shall not release or contain supplemental coolant additives.

TS 10.1.3 Drive Design

Standard Control and Drive Design

Control and drive of the radiator fan(s) shall be the Contractor’s standard design.

TS 10.1.4 Mounting

Standard Mounting Design

Mounting location of radiator shall be the Contractor's standard design.

TS 10.2 Drive Unit Cooling

If required, the drive unit shall be cooled by a dedicated heat exchanger which is sized to maintain operating fluid within the drive unit's recommended parameters of flow, pressure and temperature.

TS 10.3 Electric Drive System Cooling

The thermal management system shall maintain hybrid system components within design operating temperature limits.

The thermal management system shall maintain the electric drive system components within design operating temperature limits.

TS 11. Drive Unit

The drive unit shall be designed to operate for not less than 500,000 miles on the design operating profile without replacement or major service.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other propulsion system components and of broadcasting that data to other vehicle systems. Communication between electronic propulsion system components and other vehicle systems shall be made using the communications networks. Electronic controls shall be compatible with either 12 or 24 V power distribution, provide consistent shift quality, and compensate for changing conditions, such as variations in vehicle weight and power. At a minimum, propulsion system components consisting of the batteries, drive unit, and anti-lock braking systems shall be powered by a dedicated and isolated supply voltage to ensure data communication among components exists when the vehicle ignition is switched to the "on" position.

A nominal brake pedal application of 6 to 10 psi shall be required by the driver to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

The electronically controlled drive unit shall have on-board diagnostic capabilities, be able to monitor functions, store and time-stamp out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. The drive unit shall contain built-in protection software to guard against severe damage. The on-board diagnostic system shall trigger a visual alarm to the driver when the electronic control unit detects a malfunction.

A nominal brake pedal application of 6 to 10 psi shall be required by the driver to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

A brake pedal application of 6 to 10 psi shall be required by the driver to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

TS 12. Regenerative Braking

The powertrain shall be equipped with regenerative braking designed to improve energy efficiency and extend brake lining service life. The application of regenerative braking shall cause a smooth blending of both regenerative and service brake function and shall activate the brake lights

Actuation of ABS and/or automatic traction control (ATC) shall override the operation of the regenerative brake.

Brake lights shall illuminate when regenerative braking is activated.

The regenerative braking system shall be adjustable within the limits of the powertrain and activated when the accelerator pedal is depressed.

Regenerative braking shall be provided in order to maximize the life of wearing components in the service brake system. A dynamic resistor grid, or approved equal, shall be provided to seamlessly compensate for the lack of regenerative braking when the ESS is fully charged. Electric braking shall be supplied by the traction motor, acting as a generator. Power generated shall be utilized in the following sequence: on-board energy storage; dynamic brake resistor. Deceleration should start at throttle off, be smooth and seamless throughout the full braking application until the bus comes to a complete stop.

PSTA will work with the OEM/drive system manufacturer to determine the performance settings.

TS 13. Mounting

All electrical/electronic hardware shall be serviceable. All electrical/electronic hardware mounted in the interior of the vehicle shall be resistant to tampering from passengers.

All electrical/electronic hardware mounted on the exterior of the vehicle that is not designed to be installed in an exposed environment shall be mounted in a protective enclosure. The hardware shall be mounted in such a manner as to protect it from the environment.

All electrical/electronic hardware and its mounting shall comply with the shock and vibration requirements of SAE J1455.

All propulsion system mounting shall be mechanically isolated to minimize transfer of vibration to the body structure and provide a minimum clearance of 0.75 in. Mounts shall control the movement of the propulsion system so as not to affect performance or cause strain in piping and wiring connections to the propulsion system.

TS 13.1 Service

All systems requiring routine maintenance shall be arranged for ease of access and maintenance. The Contractor shall list all special tools, fixtures or facility requirements recommended for servicing.

All fluid fill locations shall be properly labeled to help ensure that correct fluid is added. All fillers shall be easily accessible with standard funnels, pour spouts, and automatic dispensing equipment. All lubricant sumps shall be fitted with magnetic-type drain plugs or magnets in pan.

TS 14. Hydraulic Systems

Hydraulic system service tasks shall be minimized and scheduled no more frequently than those of other major coach systems. All elements of the hydraulic system shall be easily accessible for service or unit replacement. Critical points in the hydraulic system shall be fitted with service ports so that portable diagnostic equipment may be connected or sensors for an off-board diagnostic system permanently attached to monitor system operation when applicable. A tamperproof priority system shall prevent the loss of power steering during operation of the bus if other devices are also powered by the hydraulic system.

The hydraulic system shall operate within the allowable temperature range as specified by the lubricant manufacturer.

Hydraulic System Sensors

Sensors in the main hydraulic system, excluding those in the power steering system, shall indicate on the driver's onboard diagnostic panel conditions of low hydraulic fluid level.

TS 14.1 Fluid Lines

All lines shall be rigidly supported to prevent chafing damage, fatigue failures, degradation and tension strain. Lines should be sufficiently flexible to minimize mechanical loads on the components. Lines passing through a panel, frame or bulkhead shall be protected by grommets (or similar devices) that fit snugly to both the line and the perimeter of the hole that the line passes through to prevent chafing and wear. Pipes and fluid hoses shall not be bundled with or used to support electrical wire harnesses.

Lines shall be as short as practicable and shall be routed or shielded so that failure of a line shall not allow the contents to spray or drain onto any component operable above the autoignition temperature of the fluid.

All hoses, pipes, lines and fittings shall be specified and installed per the manufacturer's recommendations.

TS 14.2 Fittings and Clamps

All clamps shall maintain a constant tension at all times, expanding and contracting with the line in response to temperature changes and aging of the line material. The lines shall be designed for use in the environment where they are installed (for example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface, and so on).

Compression fittings shall be standardized to prevent the intermixing of components. Compression fitting components from more than one manufacturer shall not be mixed, even if the components are known to be interchangeable.

TS 15. Radiator

If liquid cooling is used, the radiator and/or heat exchanger shall be a heavy-duty metal unit. The radiator shall be accessible for cleaning. Any radiator shall be easily removable from the bus. Aluminum brazed/soldered radiator and/or heat exchanger may be used for low-temperature coolant systems only.

Radiator piping shall be stainless steel, brass tubing or painted steel rated at 1000 hours of salt spray according to ASTM B117. Where practicable, hoses shall be eliminated. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360 deg. seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.

TS 16. Fluid Transfer Lines

All systems requiring lubrication shall meet or exceed component manufacturer's recommendation for installation, operation and maintenance. The fluid transfer lines shall be designed and intended for use in the environment where they are installed (for example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface and so on). Fluid lines shall not be the lowest point of the bus undercarriage. Oil and hydraulic lines shall be compatible with the substances they carry.

All lines shall be securely mounted, braced and supported as designed by the bus manufacturer to minimize vibration and chafing and shall be protected against damage, corrosion, or breakage due to strain or wear.

Hose and hose connections, where permitted, shall be made from materials resistant to corrosion and protected from fretting and high heat.

TS 17. Emissions and Exhaust

TS 17.1 Emissions (All-Electric)

The vehicle shall have no exhaust emissions resulting from the operation of the bus. The vehicle shall be rated and certified as a Zero Emission Vehicle (ZEV).

STRUCTURE

TS 18. General

TS 18.1 Design

The structure of the bus shall be designed to withstand the transit service conditions typical of an urban or intercity duty cycle throughout its service life. The vehicle structural frame shall be designed to operate with minimal maintenance throughout the 12-year design operating profile. The design operating profile specified by the Agency shall be considered for this purpose.

TS 19. Altoona Testing

The vehicle must have completed any FTA-required Altoona testing. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure that any and all such failures will not occur shall be submitted to the Agency.

DEFAULT

An Altoona Test Report shall be provided to the Agency with the Proposal submittal. Buses which have not successfully completed an Altoona Test for the type and sizes requested under this RFP will not be considered.

TS 19.1 Structural Validation

DEFAULT

Baseline Structural Analysis

The structure of the bus shall have undergone appropriate structural testing and/or analysis. At minimum, appropriate structural testing and analysis shall include Altoona testing or finite element analysis (FEA).

TS 20. Distortion

The bus, loaded to GVWR and under static conditions, shall not exhibit deflection or deformation that impairs the operation of the steering mechanism, doors, windows, passenger escape mechanisms or service doors. Static conditions shall include the vehicle at rest with any one wheel or dual set of wheels on a 6 in. curb or in a 6 in. deep hole.

TS 21. Resonance and Vibration

All structure, body and panel-bending mode frequencies, including vertical, lateral and torsional modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible or sensible resonant vibrations during normal service.

TS 21.1 Propulsion Compartment Bulkheads

The passenger and propulsion system compartments shall be separated by a fire-resistant bulkhead. This bulkhead shall preclude or retard propagation of a compartment fire into the passenger compartment. Only necessary openings shall be allowed in the bulkhead, and these shall be fire-resistant. Any passageways for the climate control system air shall be separated from the engine compartment by fire-resistant material. Piping through the bulkhead shall have fire-resistant fittings sealed at the bulkhead. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the bulkhead. Engine access panels in the bulkhead shall be fabricated of fire-resistant material and secured with fire-resistant fasteners. These panels, their fasteners and the bulkhead shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the bulkhead.

If the propulsion system doesn't contain combustion operations, then a fire-resistant bulkhead is not needed.

TS 21.2 Crashworthiness (Transit Coach)

The bus body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a 6 in. reduction in any interior dimension. Windows shall remain in place and shall not open under such a load. These requirements must be met without the roof-mounted equipment installed.

The bus shall withstand a 25 mph impact by a 4000 lb automobile at any side, excluding doorways, along either side of the bus and the articulated joint, if applicable, with no more than 3 in. of permanent structural deformation at seated passenger hip height. This impact shall not result in sharp edges or protrusions in the bus interior.

Exterior panels below 35 in. from ground level shall withstand a static load of 2000 lb applied perpendicular to the bus by a pad no larger than 5 sq. in. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

TS 22. Corrosion

The bus flooring, sides, roof, understructure and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and deicing materials for a period of 12 years or 500,000 miles, whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, with the Agency's use of proper cleaning and neutralizing agents.

All materials that are not inherently corrosion resistant shall be protected with corrosion-resistant coatings. All joints and connections of dissimilar metals shall be corrosion resistant and shall be protected from galvanic corrosion. Representative samples of all materials and connections shall withstand a two-week (336-hour) salt spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces and no weight loss of over 1 percent.

Corrosion Resistance Requirements

All exposed surfaces and the interior surfaces of tubing and other enclosed members shall be corrosion resistant through application of a corrosion protection system.

TS 23. Towing

Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 deg of the longitudinal axis of the bus. If applicable, the rear towing device(s) shall not provide a toehold for unauthorized riders. The method of attaching the towing device shall not require the removal or disconnection of front suspension or steering components. Removal of the bike rack is permitted for attachment of towing devices. The OEM shall provide the towing procedure.

DEFAULT

Shop air connectors shall be provided at the front and rear of the bus and shall be capable of supplying all pneumatic systems of the bus with externally sourced compressed air. The location of these shop air connectors shall facilitate towing operations.

No Provision of Glad-Hand Type Connectors for Towing

No glad-hand type connector shall be provided.

Two rear recovery devices/tie-downs shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of the bus. The method of attaching the tow bar or adapter shall require the specific approval of the Agency. Any tow bar or adapter exceeding 50 lb should have means to maneuver or allow for ease of use and application. Each towing device shall accommodate a crane hook with a 1 in. throat.

TS 24. Jacking

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

Decals

Apply decals to identify location of jacking pads.

TS 25. Hoisting

The bus axles or jacking plates shall accommodate the lifting pads of a two-post (or three-post if 60 ft. articulated bus) hoist system. Jacking plates, if used as hoisting pads, shall be designed to prevent the bus from falling off the hoist. Other pads or the bus structure shall support the bus on jack stands independent of the hoist.

The vehicle shall be capable of lifting by the wheels and, as necessary to meet tire load requirements, the proper number for wheel lifts and/or adapters must be used.

TS 26. Floor

TS 26.1 Design (Transit Coach)

The floor shall be essentially a continuous plane, except at the wheel housings and platforms. Where the floor meets the walls of the bus, as well as other vertical surfaces such as platform risers, the surface edges shall be blended with a circular section of radius not less than ¼ in. or installed in a fully sealed butt joint. Similarly, a molding or cover shall prevent debris accumulation between the floor and wheel housings. The vehicle floor in the area of the entrance and exit doors shall have a lateral slope not exceeding 2 deg to allow for drainage.

Bi-Level Floor Design

The floor design may consist of two levels (bi-level construction). Aft of the rear door extending to the rear settee riser, the floor height may be raised to a height no more than 21 in. above the lower level, with equally spaced steps. An increased slope shall be allowed on the upper level, not to exceed 3.5 deg off the horizontal.

Sloped Floor Design

The floor of the bus may be of a sloped low-floor design. Aft of the rear door extending to the rear settee riser, the floor may be sloped but shall not exceed 5.5 deg off the horizontal.

TS 26.2 Design (Commuter Coach)

The floor shall be essentially a continuous plane, except at the wheel housings and platforms. Where the floor meets the walls of the bus, as well as other vertical surfaces such as platform risers, the surface edges shall be blended with a circular section of radius not less than ¼ in. or installed in a fully sealed butt joint. Similarly, a

molding or cover shall prevent debris accumulation between the floor and wheel housings. The vehicle floor in the area of the entrance and exit doors shall have a lateral slope not exceeding 2 deg to allow for drainage.

The aisle of the bus shall be a sloped floor design and shall not exceed 5.5 deg off the horizontal or include one step not to exceed entrance door step heights. The floor shall be a continuous plane over the wheel housings. Where the floor meets the walls of the bus, as well as other vertical surfaces such as platform risers, the surface edges shall be blended with a circular section of radius not less than ¼ in. or installed in a fully sealed butt joint.

TS 26.3 Design (Articulated Transit Coach)

The floor shall be essentially a continuous plane, except at the wheel housings and platforms. Where the floor meets the walls of the bus, as well as other vertical surfaces such as platform risers, the surface edges shall be blended with a circular section of radius not less than ¼ in. or installed in a fully sealed butt joint. Similarly, a molding or cover shall prevent debris accumulation between the floor and wheel housings. The vehicle floor in the area of the entrance and exit doors shall have a lateral slope not exceeding 2 deg to allow for drainage.

Sloped Floor

Slope ahead aft the articulated joint shall not exceed 5.5 percent.

TS 26.4 Strength

The floor deck may be integral with the basic structure or mounted on the structure securely to prevent chafing or horizontal movement and designed to last the life of the bus. Sheet metal screws shall not be used to retain the floor, and all floor fasteners shall be serviceable from one side only. Any adhesives, bolts or screws used to secure the floor to the structure shall last and remain effective throughout the life of the coach. Tapping plates, if used for the floor fasteners, shall be no less than the same thickness as a standard nut, and all floor fasteners shall be secured and protected from corrosion for the service life of the bus.

The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an elastic deflection of no more than 0.60 in. from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. The floor, with coverings applied, shall withstand a static load of at least 150 lb applied through the flat end of a ½ in. diameter rod, with 1/32 in. radius, without permanent visible deformation.

TS 26.5 Construction

The floor shall consist of the subfloor and the floor covering that will last the life of the bus. The floor as assembled, including the sealer, attachments and covering, shall be waterproof, non-hygroscopic and resistant to mold growth. The subfloor shall be resistant to the effects of moisture, including decay (dry rot). It shall be impervious to wood-destroying insects such as termites.

Pressure-Preserved Plywood Panel

Plywood shall be certified at the time of manufacturing by an industry-approved third-party inspection agency such as APA – The Engineered Wood Association (formerly the American Plywood Association). Plywood shall be of a thickness adequate to support design loads, shall be manufactured with exterior glue, shall satisfy the requirements of a Group I Western panel as defined in PS 1-95 (Voluntary Product Standard PS 1-95, "Construction and Industrial Plywood") and shall be of a grade manufactured with a solid face and back. Plywood shall be installed with the highest grade, veneer side up. Plywood shall be pressure-treated with a preservative chemical and process such as alkaline copper quaternary (ACQ) that prevents decay and damage by insects. Preservative treatments shall use no EPA-listed hazardous chemicals. The concentration of preservative chemicals shall be equal to or greater than required for an above-ground-level application. Treated plywood will be certified for preservative penetration and retention by a third-party inspection agency. Pressure-preservative treated plywood shall have a moisture content at or below 15 percent.

As an alternative the bus may also consist of composite flooring.

TS 26.6 Construction (Commuter Coach)

The floor shall consist of the subfloor and the floor covering that will last the life of the bus. The floor as assembled, including the sealer, attachments and covering, shall be waterproof, non-hygroscopic and resistant to mold growth. The subfloor shall be resistant to the effects of moisture, including decay (dry rot). It shall be impervious to wood-destroying insects such as termites.

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 defection of no more than 0.375 in. (10 mm) from the normal plane. The floor shall withstand the application of 3.0 times gross load weight without permanent detrimental deformation.

TS 27. Platforms

TS 27.1 Driver's Area

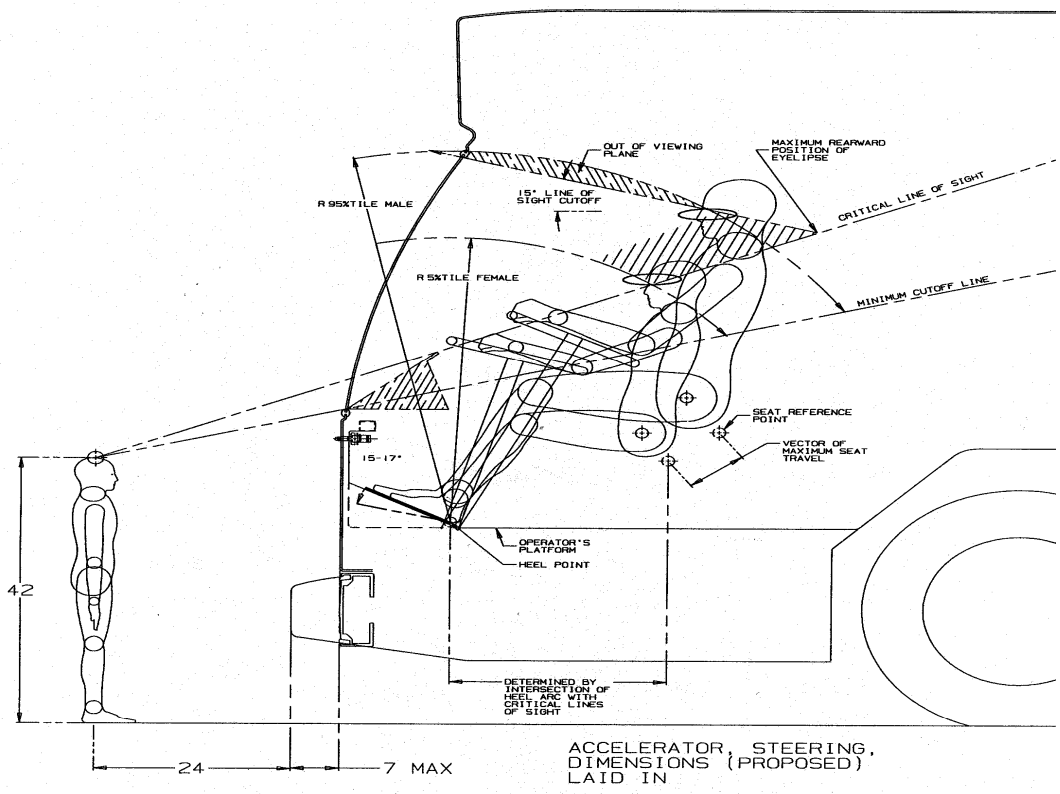
The covering of platform surfaces and risers, except where otherwise indicated, shall be the same material as specified for floor covering. Trim shall be provided along top edges of platforms unless integral nosing is provided.

No specific trim material is being specified.

TS 27.2 Driver's Platform

The driver's platform shall be of a height such that, in a seated position, the driver can see an object located at an elevation of 42 in. above the road surface, 24 in. from the leading edge of the bumper or bike rack. Notwithstanding this requirement, the platform height shall not position the driver such that the driver's vertical upward view is less than 15 deg. A warning decal or sign shall be provided to alert the driver to the change in floor level. **Figure 2** illustrates a means by which the platform height can be determined, using the critical line of sight.

FIGURE 2
Determining Platform Height



TS 27.3 Farebox

Farebox placement should minimize impact to passenger access and minimize interference with the driver's line of sight.

DEFAULT

Driver Interface Required; Platform Needed to Bring Height to Driver Access

If the driver's platform is higher than 12 in., then the farebox is to be mounted on a platform of suitable height to provide accessibility for the driver without compromising passengers' access.

Stanchions

Stanchions shall be located around the farebox.

TS 27.4 Rear Step Area to Rear Area (Transit Coach)

If the vehicle is of a bi-level floor design, then a rear step area shall be provided along the center aisle of the bus to facilitate passenger traffic between the upper and lower floor levels. This step area shall be cut into the rear platform and shall be approximately the aisle width, a minimum 12 in. deep and approximately half the height of the upper level relative to the lower level. The horizontal surface of this platform shall be covered with skid-resistant material with a visually contrasting nosing and shall be sloped slightly for drainage. A warning decal or sign shall be provided at the immediate platform area to alert passengers to the change in floor level.

TS 28. Wheel Housing

TS 28.1 Design and Construction

Sufficient clearance and air circulation shall be provided around the tires, wheels and brakes to preclude overheating when the bus is operating on the design operating profile. Wheel housings shall be constructed of corrosion-resistant and fire-resistant material.

Wheel housings, as installed and trimmed, shall withstand impacts of a 2 in. steel ball with at least 200 ft-lb of energy without penetration.

TS 28.2 Design and Construction (Transit Coach)

Interference between the tires and any portion of the bus shall not be possible in maneuvers up to the limit of tire adhesion with weights from curb weight to GVWR. Wheel housings shall be adequately reinforced where seat pedestals are installed. Wheel housings shall have sufficient sound insulation to minimize tire and road noise and meet all noise requirements of this specification.

Design and construction of front wheel housings shall allow for the installation of a radio or electronic equipment storage compartment on the interior top surface, or its use as a luggage rack.

The finish of the front wheel housings shall be scratch-resistant and complement interior finishes of the bus to minimize the visual impact of the wheel housing. If fiberglass wheel housings are provided, then they shall be color-impregnated to match interior finishes. The lower portion extending to approximately 10 to 12 in. above the floor shall be equipped with scuff-resistant coating or stainless steel trim.

Wheel housings not equipped with seats or equipment enclosure shall have a horizontal assist mounted on the top portion of the housing no more than 4 in. higher than the wheel well housing.

TS 28.3 Articulated Joint (Articulated Transit Coach)

60 ft articulated buses shall be equipped with a turntable that permanently joins the lead unit and trailing unit sections, allows relative motion between the sections about the pitch and yaw axes, and allows a small amount of relative roll between the sections without damage. A rotating turntable connection shall be provided between the lead unit and trailing unit to serve as a floor and to allow passenger access between the sections of the bus under all operating conditions. The turntable design shall provide for all horizontal and vertical turns that the bus is capable of making without introducing discontinuities between the turntable and adjacent vehicle floors.

The structures and finishes in the interconnecting section shall be designed to prevent passenger injury under all conditions. The turntable floor cover plate shall be supported so that there will be no honing of the floor plate, making it sharp at the outer edge. The gap between the floor and the turntable shall be minimized in order to prevent a tripping hazard. It shall be designed for ease of access for inspection and repairs of all devices that are part of it or devices that pass through the turntable area. Underfloor turntable components shall be easily accessible. Floor plates must be easily lifted and secured in the open position by one person for inspection and repairs. Turntable seats shall be quickly and easily removable by one person. The underfloor turntable area shall be completely enclosed by the bellows and bulkheads on the lead and trailing units to prevent drafts into the passenger compartment. The area between the turntable floor and the bellows shall be closed to prevent collection of trash in the bottom of the bellows. Closeouts shall be attached with removable fasteners. An access hatch shall be provided for routine maintenance (i.e., greasing, adjusting potentiometer, maintenance items).

An anti-jackknife joint shall be provided. This joint—by sensing vehicle speed, relative angle between the lead and trailing sections, throttle and braking actions, and any other necessary inputs—will control the degree of stiffness in the joint to ensure that the bus does not jackknife or operate in a dangerous or unsafe condition. The Agency shall approve the anti-jackknife joint. The interconnecting structure shall be designed to prevent separation of the lead and trailing units as a result of a road accident with a commercial or private vehicle. A means shall be provided so that the driver can override the control or recover from the situation. The bus shall be equipped with a reverse speed governor that shall apply the brake and accelerator interlocks when the bus speed in reverse gear exceeds 1.5 mph, but the bus shall have sufficient power in reverse to back out of wheel locator depressions at a floor hoist. The proposed configuration of these devices and the reverse-speed requirements shall be submitted for approval of the Agency.

Easy access shall be provided to overhead lines (electric, air, hydraulic, refrigerant) passing through the turntable. Hydraulic fittings shall be suitable for the given application and must be compatible with other fittings throughout the vehicle.

In order to prevent damage to the structure and electrical, air, hydraulic and refrigerant lines when the vertical or horizontal bending capabilities of the hinge are exceeded, the bus shall be provided with appropriate warning devices, brake interlocks and positive mechanical stops. These devices shall operate when the maximum bend angle is being approached in either plane.

TS 28.4 Raceway (Articulated Transit Coach)

A raceway shall be provided through the turntable area to accommodate to maximum deflection of the turntable. The raceway shall prevent chafing, binding, rubbing, crimping or leakage of all hydraulic, air, fuel and system support lines, as well as all electrical and electronic cabling through or to the turntable area. Lines shall be secured, separated and labeled at the lead and trailing unit bulkheads. Separation shall be maintained on the flexible portion of all lines through the use of a raceway. All electrical terminations and hose fittings shall be easily visible and easily tightened or removed without removing any other component. Lines, routing, securement and labeling shall be approved by the Agency.

Bulkhead fitting shall be provided for all lines: air coolant, electrical and AC at both ends of the raceway. The bulkhead area shall be easily accessible for servicing.

TS 28.5 Bellows

Replacement fabric type bellows with draft-free, no-sag bottom closure and water drains shall be provided between the lead and trailing sections to seal the bus interior and keep it free of water, dirt and drafts. Bellows hardware shall be corrosion resistant, and the underfloor area of the bellows shall be easy to clean when necessary. The passageway between the lead unit and trailing unit shall have an inside cross-section that is as nearly equal as possible to the inside cross-section of the bus bodies, with no tripping or pinching hazards created by the turntable cross-section or closeouts. The bellows shall be durable, and its supporting structure and stiffeners shall support the bellows material in a neat, sag-free manner. The Contractor shall supply information on the actual service life achieved by the type of bellows being proposed. A sample of the bellows and attaching hardware may be requested for evaluation at the Agency's option. Bellows shall be approved by the Agency.

DEFAULT

No bellows liner required.

CHASSIS

TS 29. Suspension

TS 29.1 General Requirements

The front, rear and mid (if articulated) suspensions shall be pneumatic type. The basic suspension system shall last the service life of the bus without major overhaul or replacement. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Routine adjustments shall be easily accomplished by limiting the removal or disconnecting the components.

TS 29.2 Alignment

All axles should be properly aligned so the vehicle tracks accurately within the size and geometry of the vehicle.

TS 29.3 Springs and Shock Absorbers

TS 29.3.1 Suspension Travel

The suspension system shall permit a minimum wheel travel of 2.75 in. jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and 2.75 in. rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body. Elastomeric bumpers shall be provided at the limit of jounce travel. Rebound travel may be limited by elastomeric bumpers or hydraulically within the shock absorbers. Suspensions shall incorporate appropriate devices for automatic height control so that regardless of load the bus height relative to the centerline of the wheels does not change more than ½ in. at any point from the height required. The safe operation of a bus cannot be impacted by ride height up to 1 in. from design normal ride height.

TS 29.3.2 Damping

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 three cycles or fewer after hitting road perturbations. The shock absorber bushing shall be made of elastomeric material that will last the life of the shock absorber. The damper shall incorporate a secondary hydraulic rebound stop.

TS 29.3.3 Lubrication

Standard Grease Fittings

All elements of steering, suspension and drive systems requiring scheduled lubrication shall be provided with grease fittings conforming to SAE J534. These fittings shall be located for ease of inspection and shall be accessible with a standard grease gun from a pit or with the bus on a hoist. Each element requiring lubrication shall have its own grease fitting with a relief path. The lubricant specified shall be standard for all elements on the bus serviced by standard fittings and shall be required no fewer than every 6000 miles.

TS 29.3.4 Kneeling

DEFAULT

A kneeling system shall lower the entrance(s) of the bus a minimum of 2 in. during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door(s) by the driver. The kneeling control shall provide the following functions:

- Downward control must be held to allow downward kneeling movement.
- Release of the control during downward movement must completely stop the lowering motion and hold the height of the bus at that position.
- Upward control actuation must allow the bus to return to normal floor height without the driver having to hold the control.

The brake and throttle interlock shall prevent movement when the bus is kneeled. The bus shall kneel at a maximum rate of 1.25 in. per second at essentially a constant rate. After kneeling, the bus shall rise within 4 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum vertical acceleration shall not exceed 0.2g, and the jerk shall not exceed 0.3g per second.

An indicator visible to the driver shall be illuminated until the bus is raised to a height adequate for safe street travel. An audible warning alarm will sound simultaneously with the operation of the kneeler to alert passengers and bystanders. A warning light mounted near the curbside of the front door, a minimum 2.5 in. diameter amber lens, shall be provided that will blink when the kneel feature is activated. Kneeling shall not be operational while the wheelchair ramp is deployed or in operation.

ALTERNATIVE

Full front kneeling capability.

ALTERNATIVE

Full right-side kneel capabilities.

ALTERNATIVE

Full four-wheel kneel capabilities.

TS 30. Wheels and Tires

TS 30.1 Wheels

All wheels shall be interchangeable except for the middle axle of an artic where a super single tire size is used and shall be removable without a puller. Wheels shall be compatible with tires in size and load-carrying capacity. Front wheels and tires shall be balanced as an assembly per SAE J1986.

Wheels and rims shall be hub-piloted, aluminum machine finished, with standard non-locking lug nuts.

TS 30.2 Tires

Tires shall be suitable for the conditions of transit service and sustained operation at the maximum speed capability of the bus. Load on any tire at GVWR shall not exceed the tire supplier’s rating.

The tires shall be provided under a lease agreement between the Agency and the tire supplier and shall be the appropriate size and load range for the vehicle.

ALTERNATIVE

The tires shall be supplied by the Contractor; if required by the Agency.

TS 31. Steering

Electrically assisted steering shall be provided to reduce steering effort.

TS 31.1 Steering Axle (Transit Coach)

The front axle shall be non-driving with a load rating sufficient for the bus loaded to GVWR and shall be equipped with sealed, oiled-type front wheel bearings.

All friction points on the front axle shall be equipped with replaceable bushings or inserts and, if needed, lubrication fittings easily accessible from a pit or hoist.

The steering geometry of the outside (front lock) wheel shall be within 2 deg of true Ackerman up to 50 percent lock measured at the inside (back lock) wheel. The steering geometry shall be within 3 deg of true Ackerman for the remaining 100 percent lock measured at the inside (back lock) wheel.

TS 31.2 Steering and Tag Axles (Commuter Coach)

The front and tag axles shall be solid beam, non-driving with a load rating sufficient for the bus loaded to GVWR and shall be equipped with unitized grease type wheel bearings and seals.

All friction points on the front axle shall be equipped with replaceable bushings or inserts and, if needed, lubrication fittings easily accessible from a pit or hoist.

The steering geometry of the outside (front lock) wheel shall be within 2 deg of true Ackerman up to 50 percent lock measured at the inside (back lock) wheel. The steering geometry shall be within 3 deg of true Ackerman for the remaining 100 percent lock measured at the inside (back lock) wheel.

TS 31.3 Steering Wheel

TS 31.3.1 Turning Effort

Steering effort shall be measured with the bus at GVWR, stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement and the tires inflated to recommended pressure.

Under these conditions, the torque required to turn the steering wheel 10 deg shall be no less than 5 ft-lb and no more than 10 ft-lb. Steering torque may increase to 70 ft-lb when the wheels are approaching the steering stops, as the relief valve activates.

Power steering failure shall not result in loss of steering control. With the bus in operation, the steering effort shall not exceed 55 lb at the steering wheel rim, and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

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.

TS 31.3.2 Steering Wheel, General

The steering wheel diameter shall be approximately 18 to 20 in.; the rim diameter shall be ⅞ to 1¼ in. and shaped for firm grip with comfort for long periods of time.

Steering wheel spokes and wheel thickness shall ensure visibility of the dashboard so that vital instrumentation is clearly visible at center neutral position (within the range of a 95th-percentile male, as described in SAE 1050a, Sections 4.2.2 and 4.2.3). Placement of steering column must be as far forward as possible, but either in line with or behind the instrument cluster.

TS 31.3.3 Steering Column Tilt

The steering column shall have full tilt capability with an adjustment range of no less than 40 deg from the vertical and easily adjustable by the driver and shall be accessible by a 5th percentile female and 95th percentile male.

TS 31.3.4 Steering Wheel Telescopic Adjustment

The steering wheel shall have full telescoping capability and have a minimum telescopic range of 2 in. and a minimum low-end adjustment of 29 in., measured from the top of the steering wheel rim in the horizontal position to the cab floor at the heel point.

TABLE 4

Steering Wheel Height[1] Relative to Angle of Slope

At Minimum Telescopic Height Adjustment (29 in.)		At Maximum Telescopic Height Adjustment (5 in.)	
Angle of Slope	**Height**	**Angle of Slope**	**Height**
0 deg	29 in.	0 deg	34 in.
15 deg	26.2 in.	15 deg	31.2 in.
25 deg	24.6 in.	25 deg	29.6 in.
35 deg	22.5 in.	35 deg	27.5 in.

1. Measured from bottom portion closest to driver.

TS 32. Drive Axle

If the bus is equipped with a drive axle it shall be of the proper load rating sufficient for the bus loaded to GVWR. The drive axle shall have a design life to operate for not less than 300,000 miles on the design operating profile without replacement or major repairs. The lubricant drain plug shall be magnetic type. If a planetary gear design is employed, then the oil level in the planetary gears shall be easily checked through the plug or sight gauge. The axle and driveshaft components shall be rated for both propulsion and retardation modes with respect to duty cycle.

The drive shaft shall be guarded to prevent hitting any critical systems, including brake lines, coach floor or the ground, in the event of a tube or universal joint failure.

TS 32.1 Non-Drive Axle

The non-drive axle is the drive axle without the drive gear with a load rating sufficient for the load to GVWR.

TS 33. Tag Axles (Commuter Coach)

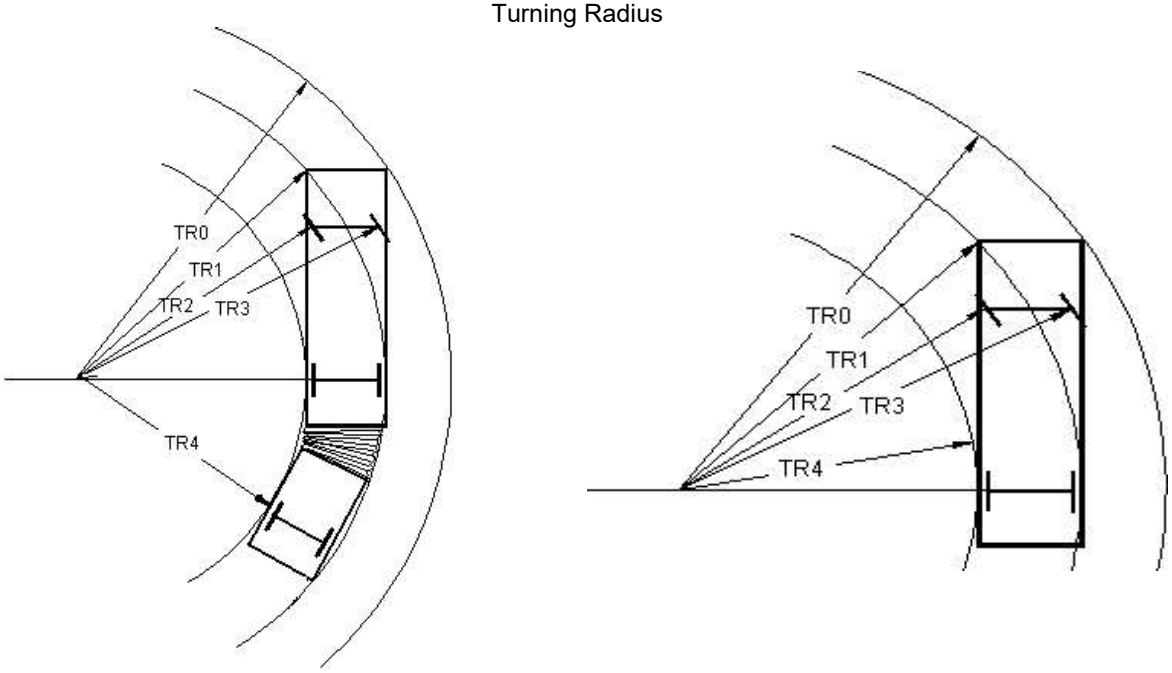
A tag axle shall be located behind the drive axle. The tag axle shall be a solid beam type with fixed steering. The tag axle shall have single tires the same size as the tires on the front and drive axles. Tag axle weight shall not exceed 14,000 lb. With full passenger seating capacity, load on any axle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

TS 34. Turning Radius

TABLE 5
Maximum Turning Radius

Bus Length (approximate)	Maximum Turning Radius (see Figure 3)	
30 ft	31 ft (TR0)	
35 ft	39 ft (TR0)	
40 ft	44 ft (TR0)	
45 ft	49 ft (TR0)	
60 ft	44.5 ft (outside front axle, TR0) 17 ft (inside rearmost axle, TR4)	

FIGURE 3
Turning Radius



TS 35. Brakes

TS 35.1 Service Brake

DEFAULT

Brakes shall be self-adjusting. Brake wear indicators (visible brake sensors) shall be provided on exposed push rods.

TS 35.1.1 Regenerative Braking

In addition to traditional mechanical friction service braking, the bus shall be equipped with regenerative braking designed to improve energy efficiency and extend brake lining service life. The application of regenerative braking shall cause a smooth blending of both regenerative and service brake function. Actuation of ABS and/or automatic traction control (ATC) shall override the operation of the regenerative brake.

TS 35.2 Actuation

Service brakes shall be controlled and actuated by a compressed air system. Force to activate the brake pedal control shall be an essentially linear function of the bus deceleration rate and shall not exceed 75 lb at a point 7 in. above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver's heel when his or her foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. The ECU for the ABS system shall be protected, yet in an accessible location to allow for ease of service.

The total braking effort shall be distributed among all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations. The manufacturer shall demonstrate compliance by providing a copy of a thermodynamic brake balance test upon request.

Microprocessor-controlled ATC shall be provided.

TS 35.3 Friction Material

The brake linings shall be made of non-asbestos material. In order to aid maintenance personnel in determining extent of wear, a provision such as a scribe line or a chamfer indicating the thickness at which replacement becomes necessary shall be provided on each brake lining. The complete brake lining wear indicator shall be clearly visible from the hoist or pit without removing backing plates.

No remote brake wear indicator shall be required.

TS 35.4 Hubs and Drums/Discs

Replaceable wheel bearing seals shall run on replaceable wear surfaces or be of an integral wear surface sealed design. Wheel bearing and hub seals and unitized hub assemblies shall not leak or weep lubricant when operating on the design operating profile for the duration of the initial manufacturer's warranty.

The vehicle may consist of either of the braking configurations stated below. Manufacturer shall state which configuration is being submitted as part of their proposal:

Drum Brakes

The bus shall be equipped with brake drums. Brake drums shall allow machining for oversized linings per manufacturer's specifications.

Disc Brakes on Front Axle

The bus shall be equipped with brake drums on the rear axle and disc brakes on the front axle. The brake drums shall allow machining for oversize linings per manufacturer's specifications, and brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

Disc Brakes on All Axles

The bus shall be equipped with disc brakes on all axles, and the brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

The brake system material and design shall be selected to absorb and dissipate heat quickly so that the heat generated during braking operation does not glaze the brake linings.

TS 35.5 Hubs and Drums (Commuter Coach)

Replaceable wheel bearing seals shall run on replaceable wear surfaces or be of an integral wear surface sealed design. Wheel bearing and hub seals and unitized hub assemblies shall not leak or weep lubricant when operating on the design operating profile for the duration of the initial manufacturer's warranty.

Drum Brakes

The bus shall be equipped with brake drums. Brake drums shall allow machining for oversized linings per manufacturer's specifications.

Disc Brakes on Front Axle

The bus shall be equipped with brake drums on the rear axle and disc brakes on the front axle. The brake drums shall allow machining for oversize linings per manufacturer's specifications, and brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

Disc Brakes on All Axles

The bus shall be equipped with disc brakes on all axles, and the brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

TS 35.6 Parking/Emergency Brake

DEFAULT

Air Brakes

The parking brake shall be a spring-operated system, actuated by a valve that exhausts compressed air to apply the brakes. The parking brake may be manually enabled when the air pressure is at the operating level per FMVSS 121.

TS 36. Interlocks (Transit Coach)

TS 36.1 Passenger Door Interlocks

To prevent opening mid and rear passenger doors while the bus is in motion, a speed sensor shall be integrated with the door controls to prevent the mid/rear doors from being enabled or opened unless the bus speed is less than 2 mph.

To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position, and a brake interlock shall engage the service brake system to stop movement of the bus when the driver's door control is moved to a mid/rear door enable or open position, or a mid or rear door panel is opened more than 3 in. from the fully closed position (as measured at the leading edge of the door panel). The interlock engagement shall bring the bus to a smooth stop and shall be capable of holding a fully loaded bus on a 6 percent grade with the transmission in gear until the interlocks are released. These interlock functions shall be active whenever the vehicle master run switch is in any run position.

All door systems employing brake and accelerator interlocks shall be supplied with supporting failure mode effects analysis (FEMA) documentation, which demonstrates that failure modes are of a failsafe type, thereby never allowing the possibility of release of interlock while an interlocked door is in an unsecured condition, unless the door master switch has been actuated to intentionally release the interlocks.

Non-adjustable brake interlock regulator.

DEFAULT

No requirements for accelerator and brake interlocks whenever front doors are open.

ALTERNATIVE

Requiring Accelerator Interlock Whenever Front Doors Are Open

An accelerator interlock shall lock the accelerator in the closed position, and a brake interlock shall engage the service brake system to stop movement of the bus whenever front doors are open.

TS 37. Pneumatic System

TS 37.1 General

The bus air system shall operate the air-powered accessories and the braking system with reserve capacity. New buses shall not leak down more than 5 psi over a 15-minute period of time as indicated on the dash gauge.

Provision shall be made to apply shop air to the bus air systems. A quick disconnect fitting shall be easily accessible and located in the engine compartment and near the front bumper area for towing. Retained caps shall be installed to protect fitting against dirt and moisture when not in use. Air for the compressor shall be filtered. The air system shall be protected per FMVSS 121.

TS 37.2 Air Compressor

ALTERNATIVE

The electrically driven air compressor shall be sized to charge the air system from 40 psi to the governor cut-off pressure in less than 4 minutes while not exceeding the fast idle speed setting of the engine.

TS 37.3 Air Lines and Fittings

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE J844 for nylon tubing if not subject to temperatures over 200 °F. The air on the delivery side of the compressor where it enters nylon housing shall not be above the maximum limits as stated in SAE J844. Nylon tubing shall be installed in accordance with the following color-coding standards:

DEFAULT

- **Green:** Indicates primary brakes and supply.
- **Red:** Indicates secondary brakes.
- **Brown:** Indicates parking brake.
- **Yellow:** Indicates compressor governor signal.
- **Black:** Indicates accessories.

Line supports shall prevent movement, flexing, tension, strain and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Rigid lines shall be supported at no more than 5 ft intervals. Nylon lines may be grouped and shall be supported at 30 in. intervals or less.

The compressor discharge line between power plant and body-mounted equipment shall be flexible convoluted copper or stainless steel line, or may be flexible Teflon hose with a braided stainless steel jacket. Other lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flanged, swivel-type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at 2 ft intervals or less.

Air lines shall be clean before installation and shall be installed to minimize air leaks. All air lines shall be routed to prevent water traps to the extent possible. Grommets or insulated clamps shall protect the air lines at all points where they pass through understructure components.

TS 37.4 Air Reservoirs

All air reservoirs shall meet the requirements of FMVSS 121 and SAE J10 and shall be equipped with drain plugs and guarded or flush type drain valves. Major structural members shall protect these valves and any automatic moisture ejector valves from road hazards. Reservoirs shall be sloped toward the drain valve. All air reservoirs shall have drain valves that discharge below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line.

TS 37.5 Air System Dryer

An air dryer shall prevent accumulation of moisture and oil in the air system. The air dryer system shall include one or more replaceable desiccant cartridges.

ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS

TS 38. Overview

The electrical system will consist of vehicle battery systems and components that generate, distribute and store power throughout the vehicle (e.g., generator, voltage regulator, wiring, relays and connectors).

Electronic devices are individual systems and components that process and store data, integrate electronic information or perform other specific functions.

The data communication system consists of the bidirectional communications networks that electronic devices use to share data with other electronic devices and systems. Communication networks are essential to integrating electronic functions, both onboard the vehicle and off.

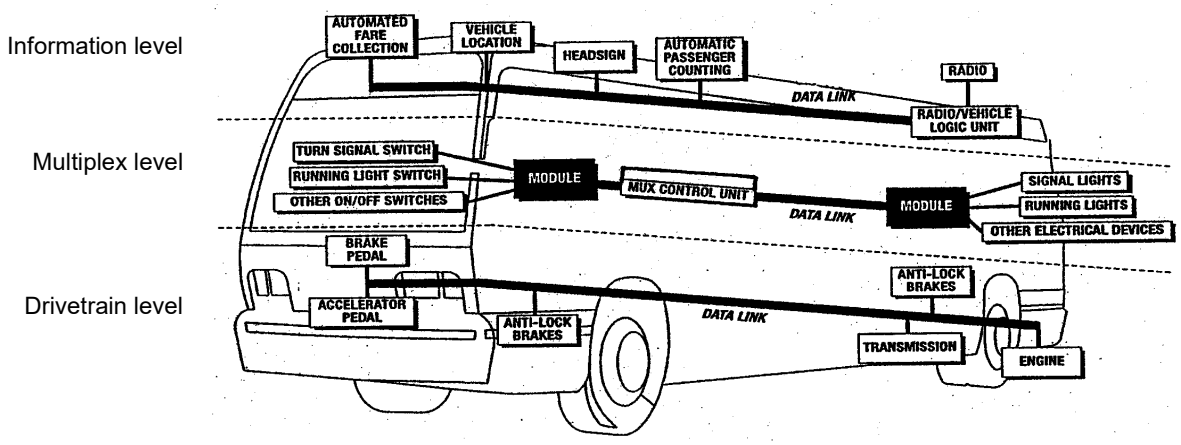
Information level systems that require vehicle information for their operations or provide information shall adhere to J1939 data standard.

Data communications systems are divided into three level store the use of multiple data networks (see **Figure 4**):

- **Powertrain level:** Components related to the powertrain, including the propulsion system components (electric energy storage, energy storage controller, motors, inverters, converters, etc.)and anti-lock braking system (ABS),which may include traction control. At a minimum, propulsion system components consisting of the batteries, drive unit, regenerative braking system, and anti-lock braking systems shall be powered by a dedicated and isolated supply voltage to ensure data communication between components exists when the vehicle is switched to the “on” position.

- **Information level:** Components whose primary function is the collection, control or display of data that is not necessary to the safe drivability of the vehicle (i.e., the vehicle will continue to operate when those functions are inoperable). These components typically consist of those required for automatic vehicle location (AVL) systems, destination signs, fareboxes, passenger counters, radio systems, automated voice and signage systems, video surveillance and similar components.
- **Multiplex level:** Electrical or electronic devices controlled through input/output signals such as discrete, analog and serial data information (i.e., on/off switch inputs, relay or relay control outputs). Multiplexing is used to control components not typically found on the drivetrain or information levels, such as lights; wheelchair lifts; doors; heating, ventilation and air conditioning (HVAC) systems (if applicable); and gateway devices.

FIGURE 4
Data Communications Systems Levels



TS 38.1 Modular Design

Design of the electrical, electronic and data communication systems shall be modular so that each electronic device, apparatus panel, or wiring bundle is easily separable from its interconnect by means of connectors.

TS 39. Environmental and Mounting Requirements

The electrical system and its electronic components shall be capable of operating in the area of the vehicle in which they will be installed, as recommended in SAE J1455.

Electrical and electronic equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system when operating within the design operating profile.

The Agency shall follow recommendations from bus manufacturers and subsystem suppliers regarding methods to prevent damage from voltage spikes generated from welding, , shorts, etc.

All electrical/electronic hardware mounted on the interior and exterior of the vehicle that is not designed to be installed in an exposed environment shall be protected.

All electrical/electronic hardware and its mounting shall comply with the shock and vibration requirements of published industry standards (SAE, ISO, etc.).

TS 40. General Electrical Requirements

TS 40.1 Low-Voltage (SLI) Batteries

Selected or specified batteries shall have a sufficient capacity to execute start after the as-delivered bus has been parked and off for a minimum of 48 hours.

TS 40.1.1 Low-Voltage Batteries (24 V)

ALTERNATIVE

Different Size Terminal Ends

Positive and negative terminal ends shall be different sizes.

ALTERNATIVE (BATTERY ELECTRIC VEHICLES)

Two Group 31 AGM Batteries

Two Group 31 Series deep-cycling sealed non spillable maintenance-free absorbed glass mat (AGM) batteries shall be provided. Each battery shall have a minimum of 1000 cold cranking amps (CCA) at 0 °F. The batteries shall be designed and installed to withstand the operating environment. Each battery shall have a purchase date no more than one year from the date of release for shipment to the Agency.

ALTERNATIVE (BATTERY ELECTRIC VEHICLES)

Two Appropriately Sized Batteries

Two appropriately sized deep-cycling sealed non spillable maintenance-free absorbed glass mat (AGM) batteries shall be provided. The batteries shall be designed and installed to withstand the operating environment. Each battery shall have a purchase date no more than one year from the date of release for shipment to the Agency.

TS 40.1.2 Low-Voltage Battery Cables

The battery terminal ends and cable ends shall be color-coded with red for the primary positive, black for negative and another color for any intermediate voltage cables. Positive and negative battery cables shall not cross each other if at all possible, shall be flexible, shall be sufficiently long to reach the batteries with the tray in the extended position without stretching or pulling on any connection, and shall not lie directly on top of the batteries. Except as interrupted by the master battery switch, battery and starter wiring, where applicable, shall be continuous cables with connections secured by bolted terminals and shall conform to specification requirements of SAE J1127–Type SGR, SGT, SGX or GXL and SAE J541 as applicable.

ALTERNATIVE

Color-code each voltage.

Jump-Start Connector

A jump-start connector shall be located next to the battery disconnect switch.

TS 40.1.3 Battery Compartment

The battery compartment shall prevent accumulation of snow, ice and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. The battery compartment temperature should not exceed manufacturer's specification.

The vehicle shall be equipped with one or more 12 VDC and 24 VDC quick disconnect switches. The battery compartment door shall conveniently accommodate operation of 12 VDC and 24 VDC quick disconnect switches.

The battery quick disconnect access door shall be identified with a decal. The decal size shall not be less than 3.5 × 5 in. (8.89 × 12.7 cm).

The door shall be flush-fitting and incorporate a spring tensioner or equal to retain the door in a closed position when not in use.

Non-Locking Access Door

This access door shall not require any special locking devices to gain access to the switch, and it shall be accessible without removing or lifting the panel.

The batteries shall be securely mounted on a stainless steel or equivalent tray that can accommodate the size and weight of the batteries. The battery tray, if applicable, shall pull out easily and properly support the batteries while they are being serviced. The tray shall allow each battery cell to be easily serviced. A locking device shall retain the battery tray to the stowed position.

The same fire-resistant properties must apply to the battery compartment. No sparking devices should be located within the battery box.

TS 40.1.4 Auxiliary Electronic Power Supply

If required, gel-pack, or any form of sealed (non-venting) batteries used for auxiliary power are allowed to be mounted on the interior of the vehicle if they are contained in an enclosed, non-airtight compartment and accessible only to maintenance personnel. This compartment shall contain a warning label prohibiting the use of lead-acid batteries.

TS 40.1.5 Master Battery Switch

The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation, and prevent corrosion from fumes and battery acid when the batteries are washed off or are in normal service.

The master switch shall be capable of carrying and interrupting the total circuit load.

Single Switch

The batteries shall be equipped with a single switch for disconnecting both 12 V and 24 V power.

TS 40.1.6 Low-Voltage Generation and Distribution

The low-voltage generating systems shall maintain the charge on fully charged batteries.Voltage monitoring and over-voltage output protection (recommended at 32 V) shall be provided. Charging profile shall be maintained within battery manufacturer’s guidelines or specifications.

Dedicated power and ground shall be provided as specified by the component or system manufacturer. Cabling to the equipment must be sized to supply the current requirements with no greater than a 5 percent volt drop across the length of the cable.

TS 40.1.7 Circuit Protection

All branch circuits, except battery-to-starting-motor and battery-to-generator/alternator circuits, shall be protected by current-limiting devices such as circuit breakers, fuses or solid-state devices sized to the requirements of the circuit. The circuit breaker fuses shall be easily accessible for authorized personnel. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable. This requirement applies to inline fuses supplied by either the Contractor or a supplier. Fuse holders shall be constructed to be rugged and waterproof. All manual reset circuit breakers critical to the operation of the bus shall be mounted in a location convenient to the Agency mechanic with visible indication of open circuits. The Agency shall consider the application of automatic reset circuit breakers on a case-by-case basis. The Contractor shall show all in-line fuses in the final harness drawings. Any manually resettable circuit breakers shall provide a visible indication of open circuits.

Circuit breakers or fuses shall be sized to a minimum of 15 percent larger than the total circuit load. The current rating for the wire used for each circuit must exceed the size of the circuit protection being used.

TS 40.2 Grounds

The battery shall be grounded to the vehicle chassis/frame at one location only, as close to the batteries as possible. When using a chassis ground system, the chassis shall be grounded to the frame in multiple locations, evenly distributed throughout the vehicle to eliminate ground loops. No more than three ring terminal connections shall be made per ground stud with spacing between studs ensuring conductivity and serviceability. Electronic equipment requiring an isolated ground of the battery (i.e., electronic ground) shall not be grounded through the chassis.

TS 40.3 Low Voltage and High Voltage Wiring and Terminals

All power and ground wiring shall conform to specification requirements of SAE J1127, J1128 and J1292. All high-voltage power and ground wiring shall conform to specification requirements of SAE J1763, J1654 J2910. In the case of conflicts with the requirements below, SAE standards shall apply. Double insulations shall be maintained as close to the junction box, electrical compartment or terminals as possible. The requirement for double insulations shall be met by wrapping the harness with plastic electrical tape or by sheathing all wires and harnesses with nonconductive, rigid or flexible conduit.

The bus shall be manufactured so that high-voltage systems and cabling do not interfere with the operation of low-voltage control systems. To this end, high-voltage cabling and low-voltage control wiring must be separated as far as practical. Additionally, parallel runs of high-voltage cabling and low-voltage control wiring shall be minimized.

Wiring shall be grouped, numbered and/or color-coded. Wiring harnesses shall not contain wires of different voltage classes unless all wires within the harness are insulated for the highest voltage presenting the harness. Kinking, grounding at multiple points, stretching, and exceeding minimum bend radius shall be prevented.

Strain-relief fittings shall be provided at all points where wiring enters electrical compartments. Grommets or other protective material shall be installed at points where wiring penetrates metal structures outside of electrical enclosures. Wiring supports shall be protective and nonconductive at areas of wire contact and shall not be damaged by heat, water, solvents or chafing.

To the extent practicable, wiring shall not be located in environmentally exposed locations under the vehicle. Wiring and electrical equipment necessarily located under the vehicle shall be insulated from water, heat, corrosion and mechanical damage. Where feasible, front-to-rear electrical harnesses should be installed above the window line of the vehicle.

All wiring harnesses over 5 ft long and containing at least five wires shall include 10 percent (minimum one wire) excess wires for spares. This requirement for spare wires does not apply to datalinks and communication cables. Wiring harness length shall allow end terminals to be replaced twice without pulling, stretching or replacing the wire. Terminals shall be crimped to the wiring according to the connector manufacturer's recommendations for techniques and tools. All cable connectors shall be locking type, keyed and sealed, unless enclosed in watertight cabinets or vehicle interior. Pins shall be removable, crimp contact type, of the correct size and rating for the wire being terminated. Unused pin positions shall be sealed with sealing plugs. Adjacent connectors shall use either different inserts or different insert orientations to prevent incorrect connections.

Terminals shall be crimped, corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. When using pressure type screw terminal strips, only stranded wire shall be used. Insulation clearance shall ensure that wires have a minimum of "visible clearance" and a maximum of two times the conductor diameter or 1/16 in., whichever is less. When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands that can penetrate the insulation of the inner wires.

Ultra-sonic and T-splices may be used with 8 AWG or smaller wire. When a T-splice is used, it shall meet these additional requirements:

- It shall include a mechanical clamp in addition to solder on the splice.
- The wire shall support no mechanical load in the area of the splice.
- The wire shall be supported to prevent flexing.

All splicing shall be staggered in the harness so that no two splices are positioned in the same location within the harness.

The instrument panel and wiring shall be easily accessible for service from the driver's seat or top of the panel. The instrument panel shall be separately removable and replaceable without damaging the instrument panel or gauges. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.

TS 40.4 High-Voltage Generation and Distribution

All high voltage wiring shall be clearly marked, and isolated from low voltage wiring. High voltage wiring shall be loomed in a bright red or orange, watertight, anti-abrasive, flexible conduit. High voltage wiring shall utilize grommet less bulkhead fitting to pass through walls and bulkheads. The entire high voltage wiring circuit shall be watertight. Power cables shall be flexible multi-stranded copper with a hypalon or neoprene jacket. The jacket insulation shall be rated at a minimum of 900 volts. The conductors for the traction battery and motor cable shall be sized for continuous operation at maximum controller current without exceeding a 20 F degree rise above ambient temperature. The conductors for other power cables shall be sized for continuous operation at their maximum expected current without exceeding a 20 F degree rise above ambient temperature. Connections between battery blocks shall be fastened, providing a contact area at least as large as the circular area of the cell post. Other connectors shall be selected and sized to carry the maximum expected current.

TS 40.5 High Voltage Disconnect System

The high-voltage system shall be fitted with automatic disconnecting contactors located as closely as possible to the positive and negative battery output terminals so as to minimize the external circuitry that is not de-

energized when the devices open. These contractors shall be in addition to any such devices incorporated in the motor controller, and shall not require electrical power to operate (that is, they shall be normally open when unpowered). The contactors shall be rated as capable of interrupting the maximum normally encountered charging or operating current at the highest voltage likely to be encountered (maximum charger-output voltage, or charger-input voltage, whichever is greater). Contactors shall be controlled by the "High Voltage Disconnect" switch, and any safety-critical interlocks and interlock loops, motor-controller overcurrent- protection functions, and vehicle crash and/or fire sensors. Reset of the contactors shall require the deliberate action of the operator or maintenance personnel. Contactors should provide a visual or electrical indication of their status (open or closed) or of a failure to function.

Lids to high voltage enclosures must be interlocked, such that opening an enclosure automatically disconnects the high voltage system. Any high voltage cable of 5 amps or greater must also have an interlock such that disconnecting any cable of this type will disconnect the high voltage system.

This feature could be part of the emergency shutdown system, providing an organized / fail safe method for shutting the high voltage system down by manual activation of an emergency switch (red palm but ton), sensed isolation fault between high voltage and chassis, opening an interlocked panel, or disconnecting high voltage cables of 5 amps or greater.

TS 40.6 High Voltage Wiring

High-voltage wiring shall conform in all respects to SAE recommended practices J1654 (High- voltage Primary Cable), J1673 (High-Voltage Automotive Wiring), and J1742 (High Voltage On-Board Connectors). The outer layer of insulation on high-voltage wiring shall be bright orange or yellow in color.

High-voltage wiring shall be protected from road hazards and collision damage by major structural members. Wiring shall be continuous cables with connections secured using suitable vibration resistant fasteners such as nylocks or lock washers on bolted terminals. Terminals shall be rated for the expected current, corrosion-resistant, and crimped or secured with setscrews.

Wiring length shall allow replacement of end terminals without pulling, stretching, or replacing the wire. Double insulation shall be maintained as close to the terminals as practicable. Terminal shanks and cable ends shall be protected by shrink tubing or vulcanized covers. Shrink tubing or vulcanized covers shall be the color coded to indicate polarity; black to indicate terminals normally negative, red for terminals normally positive. Red or black shall not be used for protective covers of terminals on wiring normally carrying high-voltage alternating currents. All high-voltage wiring shall be durably labeled and numbered to be identical from one bus to the next.

All HV wiring that runs through areas where rotating or moving components might cause abrasion must be enclosed in orange or yellow non-conductive conduit. The conduit must be securely anchored at least at each end, and must be located out of the way of possible snagging or damage. Wiring inside of battery enclosures is not required to be covered, but must be adequately secured and protected from abrasion and mechanical stress.

All external heat sinks or metal housings for HV components (i.e. motors, inverters, etc.) must be securely grounded. Within an enclosure, exposed (un-insulated) HV terminals and conductors of opposing polarities must be spaced with an adequate air gap to prevent arcing due to dielectric breakdown. It is strongly recommended that the spacing is significantly larger than this to reduce the risk of accidental short circuit during service.

High-voltage wiring shall not be bundled with low-voltage wiring (except appropriately fused and distinctively marked high-voltage instrumentation-signal wires may be routed with other instrumentation-signal wires if the conduit or bundle is also distinctively marked as carrying high voltage). Grommets of elastomeric material shall be provided at points where wiring penetrates metal or rigid structures. Wiring supports shall be non-conductive. Precautions shall be taken to avoid damage from heat, water, solvents, commonly encountered automotive fluids, and chafing. Wire shall support no mechanical loads in the area of terminals and the wires shall be supported to prevent flexing. All wiring shall be numbered to be identical from one bus to the next.

TS 40.7 High Voltage Overcurrent Protection

All wiring and connected devices and equipment shall be protected against overcurrent by fuses or circuit breakers. Fuses and circuit breakers shall be rated to protect against prolonged overloads and short circuit conditions. The time-current characteristics of overcurrent protective devices and functions shall minimize hazard to personnel and equipment in the event of failure of any single protective device of function.

TS 40.8 High Voltage Grounding

The bus chassis and all conductive structural elements of the vehicle shall be electrically interconnected by means of low-resistance mechanical connections, ground straps, wires, or welded connections. Buses with a nonconductive chassis shall be provided with a low-impedance grounding system suitably sized for the level and duration of possible faults currents. Ground paths shall not exhibit an electrical potential in excess of 0.1-volt relative to each other while the bus is off or in normal operating or charging configurations. The high-voltage electrical system shall not, in any normally encountered operational or charging configuration, make use of the vehicle chassis or of the low voltage grounding system as a current path. The high-voltage electrical system shall not, in any normally encountered operation or charging configuration, induce any detectable electrical current in the vehicle chassis, in the low-voltage grounding system, or in the low-voltage electrical systems except as a design feature of instrumentation circuits.

HV and low-voltage (chassis-grounded) circuits must be physically segregated. If both HV and grounded circuits are present within an enclosure, they must be separated by insulating barriers or other moisture resistant, UL recognized insulating materials, or well separated so that there is no risk of arcing due to dielectric break-down or contact due to slight shifting of components during use.

If hazardous voltages are contained within a conductive exterior case or enclosed that may be exposed to human contact as installed in the vehicle, such case or enclosure shall be provided with a conductive connection to the vehicle chassis or grounding system.

Energy storage components (including batteries) and major power electronics components shall have their conductive external cases connected to the vehicle chassis or grounding system by a ground strap, wire, welded connection or other suitable low resistance mechanical connection. This grounding connection shall provide a low impedance path, sized appropriately for the level and duration of possible fault currents. Ground paths shall not be carried through hinges, bolted joints (except those specifically designed as electrical connectors), body or propulsion system mountings.

Other components that receive hazardous voltages from sources outside their enclosures may have their cases grounded either directly (as above) or indirectly through the wiring harness that carries the voltage(s) from the external source. Disconnecting the wiring harness used to provide indirect case grounding shall also disconnect the source of hazardous voltages.

Loss of isolation of the high-voltage electrical system from the chassis grounding system shall cause a dash-board-warming lamp to illuminate and automatic disconnect of the high-voltage system.

TS 40.9 DC-DC Converters and DC-AC Converters

The buses shall be fitted with a device or controller function to maintain the low-voltage batteries at a full state-of-charge using energy drawn from the traction battery.

The high-voltage inputs to individual DC-to-AC and DC-to-DC conversion devices shall be protected by circuit breakers or fuses. The output circuits of DC-to-AC and DC-to-DC conversion devices shall also be protected by appropriately rated circuit breakers or fuses.

Verify that the charger/charge function works throughout the acceptance testing. Verify that the fuses or circuit breakers are appropriately sized by consulting the conversion devices maker's literature in the contractors engineering files.

TS 40.10 Electrical Components

All electrical components, including switches, relays, flashers and circuit breakers, shall be heavy-duty designs with either a successful history of application in heavy-duty vehicles or design specifications for an equivalent environment.

All electric motors shall be heavy-duty brushless type where practical and have a continuous duty rating of no fewer than 40,000 hours (except washer pumps, auxiliary heater pumps, defroster and wiper motors). All electric motors shall be easily accessible for servicing.

TS 40.11 Electrical Compartments

All relays, controllers, flashers, circuit breakers and other electrical components shall be mounted in easily accessible electrical compartments. All compartments exposed to the outside environment shall be corrosion-resistant and sealed. The components and their functions in each electrical compartment shall be identified and their location permanently recorded on a drawing attached to the inside of the access panel or door. The drawing shall be protected from oil, grease, fuel and abrasion.

The front compartment shall be completely serviceable from the driver's seat, vestibule or from the outside. For vehicles with an internal combustion engine, "Rear start and run" controls shall be mounted in an accessible location in the engine compartment and shall be protected from the environment.

TS 41. General Electronic Requirements

If an electronic component has an internal real-time clock, it shall provide its own battery backup to monitor time when battery power is disconnected, and/or it may be updated by a network component. If an electronic component has an hour meter, it shall record accumulated service time without relying on battery backup.

All electronic component suppliers shall ensure that their equipment is self-protecting in the event of shorts in the cabling, and also in over-voltage (over 32 VDC on a 24 VDC nominal voltage rating with a maximum of 50 VDC) and reverse polarity conditions. If an electronic component is required to interface with other components, it shall not require external pull-up and/or pull-down resistors. Where this is not possible, the use of a pull-up or pull-down resistor shall be limited as much as possible and easily accessible and labeled.

TS 41.1 Wiring and Terminals

Kinking, grounding at multiple points, stretching and reducing the bend radius below the manufacturer's recommended minimum shall not be permitted.

TS 41.1.1 Discrete I/O (Inputs/Outputs)

All wiring to I/O devices, either at the harness level or individual wires, shall be labeled or color-coded in a fashion that allows unique identification at a spacing not exceeding 4 in. Wiring for each I/O device shall be bundled together. If the I/O terminals are the same voltages, then jumpers may be used to connect the common nodes of each I/O terminal.

TS 41.1.2 Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However, certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable.

> **NOTE:** A shield grounded at both end forms a ground loop, which can cause intermittent loss of control or faults.

When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.

TS 41.1.3 Communications

The data network cabling shall be selected and installed according to the selected protocol requirements. The physical layer of all network communications systems shall not be used for any purpose other than communication among the system components, unless provided for in the network specifications.

Communications networks that use power line carriers (e.g., data modulated on a 24 V power line) shall meet the most stringent applicable wiring and terminal specifications.

TS 41.1.4 Radio Frequency (RF)

RF components, such as radios, video devices, cameras, global positioning systems (GPS), etc., shall use coaxial cable to carry the signal. All RF systems require special design consideration for losses along the cable. Connectors shall be minimized, since each connector and crimp has a loss that will contribute to attenuation of the signal. Cabling should allow for the removal of antennas or attached electronics without removing the installed cable between them. If this cannot be done, then a conduit of sufficient size shall be provided for ease of attachment of antenna and cable assembly. The corresponding component vendors shall be consulted for proper application of equipment, including installation of cables.

TS 41.1.5 Audio

Cabling used for microphone level and line level signals shall be 22 AWG minimum with shielded twisted pair. Cabling used for amplifier level signals shall be 18 AWG minimum.

TS 42. Multiplexing

TS 42.1 General

Versatility and future expansion shall be provided for by expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs though the addition of new modules and/or the utilization no existing spare inputs and outputs. All like components in the multiplex system shall be modular and interchangeable with self-diagnostic capabilities. The modules shall be easily accessible for troubleshooting electrical failures and performing system maintenance. Multiplex input/output modules shall use solid-state devices to provide extended service life and individual circuit protection.

Ten percent of the total number of inputs and outputs, or at least one each for each voltage type utilized (0 V, 12 V, 24 V) at each module location shall be designated as spares. If not ten percent, manufacturer shall state amount of spares to be provided.

TS 42.2 System Configuration

Multiplexing may either be distributed or centralized. A distributed system shall process information on multiple control modules within the network. A centralized system shall process the information on a single control module. Either system shall consist of several modules connected to form a control network.

TS 42.2.1 I/O Signals

The input/output for the multiplex system may contain four types of electrical signals: discrete, modulating, analogue, serial data.

Discrete signals shall reflect the on/off status of switches, levers, limit switches, lights, etc. Analog signals shall reflect numerical data as represented by a voltage signal (0–12 V, 10–24 V, etc.)or current signal (4–20 mA). Both types of analog signals shall represent the status of variable devices such as rheostats, potentiometers, temperature probes, etc. Serial data signals shall reflect ASCII or alphanumeric data used in the communication between other onboard components.

TS 43. Data Communications

TS 43.1 General

All data communication networks shall be either in accordance with a nationally recognized interface standard, such as those published by SAE, IEEE or ISO, or shall be published to the Agency with the following minimum information:

- Protocol requirements for all timing issues (bit, byte, packet, inter-packet timing, idle line timing, etc.) packet sizes, error checking and transport (bulk transfer of data to/from the device).
- Data definition requirements that ensure access to diagnostic information and performance characteristics.
- The capability and procedures for uploading new application or configuration data.
- Access to revision level of data, application software and firmware.
- The capability and procedures for uploading new firmware or application software.
- Evidence that applicable data shall be broadcast to the network in an efficient manner such that the overall network integrity is not compromised.

Any electronic vehicle components used on a network shall be conformance tested to the corresponding network standard.

TS 43.2 Propulsion System Level

Propulsion system components, consisting of the electric motors, energy storage, power electronics, ABS and ATC and all other related components, shall be integrated and communicate fully with respect to vehicle operation with data using SAE Recommended Communications Protocols such as J1939 and/or J1708/J1587 with forward and backward compatibilities or other open protocols. Data communication among components shall be ensured when the vehicle is on operation.

TS 43.2.1 Diagnostics, Fault Detection and Data Access

Drivetrain performance, maintenance and diagnostic data, and other electronic messages shall be formatted and transmitted on the communications networks.

The drivetrain level shall have the ability to record abnormal events in memory and provide diagnostic codes and other information to service personnel. At a minimum, this network level shall provide live/fail status, current hardware serial number, software/data revisions and uninterrupted timing functions.

TS 43.2.2 Programmability (Software)

The drivetrain-level components shall be programmable by the Agency with limitations as specified by the subsystem Supplier.

TS 43.3 Multiplex Level

TS 43.3.1 Data Access

At a minimum, information shall be made available via a communication port on the multiplex system. The location of the communication port shall be easily accessible. A hardware gateway and/or wireless communications system are options if requested by the Agency. The communication port(s) shall be located as specified by the Agency.

TS 43.3.2 Diagnostics and Fault Detection

The multiplex system shall have a proven method of determining its status (system health and input/output status) and detecting either active (online) or inactive (offline) faults through the use of onboard visual/audible indicators.

In addition to the indicators, the system shall employ an advanced diagnostic and fault detection system, which shall be accessible via either a personal computer or a handheld unit. Either unit shall have the ability to check logic function.

A mock-up board, where key components of the multiplexing system are replicated on a functional model, shall be provided as a tool for diagnostic, design verification and training purposes. If required, the mock-up board should be priced separately in the Pricing Schedule.

TS 43.3.3 Programmability (Software)

The multiplex system shall have security provisions to protect its software from unwanted changes. This shall be achieved through any or all of the following procedures:

- Password protection
- Limited distribution of the configuration software

- Limited access to the programming tools required to change the software
- Hardware protection that prevents undesired changes to the software

Provisions for programming the multiplex system shall be possible through a PC or laptop. The multiplex system shall have proper revision control to ensure that the hardware and software are identical on each vehicle equipped with the system. Revision control shall be provided by all of the following:

- Hardware component identification where labels are included on all multiplex hardware to identify components
- Hardware series identification where all multiplex hardware displays the current hardware serial number and firmware revision employed by the module
- Software revision identification where all copies of the software in service display the most recent revision number
- A method of determining which version of the software is currently in use in the multiplex system

DEFAULT

Revision control labels shall be electronic.

TS 43.4 Electronic Noise Control

Electrical and electronic subsystems and components on all buses shall not emit electromagnetic radiation that will interfere with onboard systems, components or equipment, telephone service, radio or TV reception, or violate regulations of the Federal Communications Commission.

Electrical and electronic subsystems on the coaches shall not be affected by external sources of RFI/EMI. This includes, but is not limited to, radio and TV transmission, portable electronic devices including computers in the vicinity of or onboard the buses, AC or DC power lines, and RFI/EMI emissions from other vehicles.

As a recommendation, no vehicle component shall generate or be affected by EMI/RFI that can disturb the performance of electrical/electronic equipment as defined in SAE J1113 and UNECE Council Directive 95/54(R10).

DRIVER PROVISIONS, CONTROLS AND INSTRUMENTATION

TS 44. Driver's Area Controls

TS 44.1 General

In general, when designing the driver's area, it is recommended that SAE J833, "Human Physical Dimensions," be used.

Switches and controls shall be divided into basic groups and assigned to specific areas, in conformance with SAE J680, revised 1988, "Location and Operation of Instruments and Controls in Motor Truck Cabs," and be essentially within the hand reach envelope described in SAE J287, "Driver Hand Control Reach."

TS 44.2 Glare

The driver's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be matte black or dark gray in color wherever possible to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the driver's area shall be avoided.

TS 44.3 Visors/Sun Shades

Driver's Window Sunscreens

An adjustable roller type sunscreen shall be provided over the driver's windshield and/or the driver's side window. The sunscreen shall be capable of being lowered to the midpoint of the driver's window. When deployed, the screen shall be secure, stable, and shall not rattle, sway or intrude into the driver's field of view due to the motion of the coach or as a result of air movement. Once lowered, the screen shall remain in the lowered position until returned to the stowed position by the driver. Sunscreen shall be shaped to minimize light leakage between the visor and windshield pillars to the extent possible.

TS 44.4 Driver's Controls

Frequently used controls must be in easily accessible locations. These include the door control, kneel control, windshield wiper/washer controls, ramp, and lift and run switch. Any switches and controls necessary for the safe operation of the bus shall be conveniently located and shall provide for ease of operation. They shall be identifiable by shape, touch and permanent markings. Controls also shall be located so that passengers may not easily tamper with control settings.

All panel-mounted switches and controls shall be marked with easily read identifiers. Graphic symbols shall conform to SAE J2402, "Road Vehicles – Symbols for Controls, Indicators, and Tell Tales," where available and applicable. Color of switches and controls shall be dark with contrasting typography or symbols.

Mechanical switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from a convenient location. Switches, controls and instruments shall be dust- and water-resistant.

All switches/controls in the driver's control area shall be mounted in an angled panel steep enough to discourage drivers from using it as a personal storage area for items like food, drinks, cell phones, etc.

The shift selector shall be mounted in an angled panel steep enough to discourage drivers from using it as a personal storage area for electronic devices such as cell phones, music players, navigation systems, etc.

TS 44.5 Normal Bus Operation Instrumentation and Controls

The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the operator. The operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.

Systems or components monitored by onboard diagnostics system shall be displayed in clear view of the operator and provide visual and/or audible indicators. The intensity of indicators shall permit easy determination of on/off status in bright sunlight but shall not cause a distraction or visibility problem at night. All indicators shall be illuminated using backlighting.

The indicator panel shall be located in Area 1 or Area 5, within easy view of the operator instrument panel. All indicators shall have a method of momentarily testing their operation. The audible alarm shall be tamper-resistant and shall have an outlet level between 80 and 83 dBA when measured at the location of the operator's ear.

Onboard displays visible to the operator shall be limited to indicating the status of those functions described herein that are necessary for the operation of the bus. All other indicators needed for diagnostics and their related interface hardware shall be concealed and protected from unauthorized access. **Table 6** represents instruments and alarms. The intent of the overall physical layout of the indicators shall be in a logical grouping of systems and severity nature of the fault.

Consideration shall be provided for future additions of spare indicators as the capability of onboard diagnostic systems improves. Blank spaces shall contain LEDs.

TABLE 6 (Transit Coach)
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/Audible
Master run switch	Rotary, four-position detent	Side console	Master control for bus, off, day run, night run and clearance ID lights	
System start, front	Approved momentary switch	Side console	Activates vehicle systems	
Drive selector	Touch panel switch	Side console	Provides selection of propulsion: forward, reverse and neutral	Gear selection
HVAC	Switch or switches to control HVAC	Side console	Permits selection of passenger ventilation: off, cool, heat, low fan, high fan or full auto with on/off only	
Driver's ventilation	Switch or switches to control driver ventilation	Side console or dash left wing	Permits supplemental ventilation: fan off, low or high	
Defroster fan	Switch or switches to control defroster fan	Side console or dash left wing	Permits defroster: fan off, low, medium or high	
Defroster temperature	Variable position	Side console or dash left wing	Adjusts defroster water flow and temperature	
Windshield wiper	One-variable position switch operating both wipers	Dash left wing	Variable speed control of left and right windshield wipers	
Windshield washer	Push button	Dash left wing	Activates windshield washers	
Dash panel lights	Rotary rheostat or stepping switch	Side console or dash left wing	Provides adjustment for light intensity in night run position	
Interior lights	Three-position switch	Side console	Selects mode of passenger compartment lighting: off, on or reduced lighting	
WC ramp/ kneel enable	Two-position switch[1]	Side console or dash right wing	Permits operation of ramp and kneel operations at each door remote panel	Amber light
Front door ramp/kneel enable	Two-position keyed switch[1]	Front door remote or dash right wing	Permits ramp and kneel activation from front door area, key required[1]	Amber light
Front door ramp	Three-position momentary switch	Right side of steering wheel	Permits deploy and stow of front ramp	Red light
Front kneel	Three-position momentary switch	Front door remote	Permits kneeling activation and raise and normal at front door remote location	Amber or red dash indicator exterior alarm and amber light
Silent alarm	Recessed momentary push button	Side console	Activates emergency radio alarm at dispatch and permits covert microphone and/or enables destination sign emergency message	

TABLE 6 (Transit Coach)

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/Audible
Video system event switch	Momentary on/off switch with plastic guard	Side console	Triggers event equipment and event light on dash	Amber light
Left remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of left exterior mirror	
Right remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of right exterior mirror	
Mirror heater	Switch or temperature activated	Side console	Permits heating of outside mirrors when required	
Passenger door control	Five-position handle type detent or two momentary push buttons	Side console, forward	Permits open/close control of front and rear passenger doors	Red light
Rear door override	Two-position switch in approved location	Side console, forward	Allows driver to override activation of rear door passenger tape switches	
System shutdown override	Momentary switch with operation protection	Side console	Permits driver to override auto system shutdown	
Hazard flashers	Two-position switch	Side console or dash right wing	Activates emergency flashers	Two green lights
Fire suppression	Red push button with protective cover	Dash left wing or dash center	Permits driver to override and manually discharge fire suppression system	Red light
Mobile data terminal	Mobile data terminal coach operator interface panel	Above right dash wing	Facilitates driver interaction with communication system and master log-on	LCD display with visual status and text messages
Farebox interface	Farebox coach operator interface panel	Near farebox	Facilitates driver interaction with farebox system	LCD display
Destination sign interface	Destination sign interface panel	In approved location	Facilitates driver interaction with destination sign system, manual entry	LCD display
Turn signals	Momentary push button (two required) raised from other switches	Left foot panel	Activates left and right turn signals	Two green lights and optional audible indicator
PA manual	Momentary push button	In approved location	Permits driver to manually activate public address microphone	
Low-profile microphone	Low-profile discrete mounting	Steering column	Permits driver to make announcements with both hands on the wheel and focusing on road conditions	
High beam	Push button	In approved location	Permits driver to toggle between low and high beam	Blue light
Parking brake	Pneumatic PPV	Side console or dash left wing	Permits driver to apply and release parking brake	Red light
Master door/ interlock	Multi-pole toggle, detented	Out of operator's reach	Permits driver override to disable door and brake/throttle interlock	Red light

TABLE 6 (Transit Coach)

Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/Audible
Warning interlocks deactivated	Red indicator light	Dash panel center	Illuminates to warn driver that interlocks have been deactivated	Red light
Alarm acknowledge	Push button momentary	Approved location	Permits driver to acknowledge alarm condition	
Rear door passenger sensor disable	Two-position switch	In sign compartment or driver's barrier compartment	Permits driver to override rear door passenger sensing system	
Indicator/ alarm test button	Momentary switch or programming[1]	Dash center panel	Permits driver to activate test of sentry, indicators and audible alarms	All visuals and audibles
Speedometer	Speedometer, odometer, and diagnostic capability, 5-mile increments	Dash center panel	Visual indication of speed and distance traveled, accumulated vehicle mileage, fault condition display	Visual
Air pressure gauge	Primary and secondary, 5 psi increments	Dash center panel	Visual indication of primary and secondary air systems	Red light and buzzer
Fire detection	Coach operator display	Property specific or dash center	Indication of fire detection activation by zone/location	Buzzer and red light
Door obstruction	Sensing of door obstruction	Dash center	Indication of rear door sensitive edge activation	Red light and buzzer
Door ajar	Door not properly closed	Property specific or dash center	Indication of rear door not properly closed	Buzzer or alarm and red light
Low system air pressure	Monitors primary and secondary air tank pressure	Dash center	Indication of low air system pressure	Buzzer and red light
System coolant indicator	Low coolant indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects low coolant condition	Amber light
Hot system indicator	Temperature indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects system overheat condition and initiates time delay shutdown	Red light
ABS indicator	Detects system status	Dash center	Displays system failure	Amber light
HVAC indicator	Detects system status	Dash center	Displays system failure	Amber or red light
LV charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects no-charge condition and optionally detects battery high, low, imbalance, no-charge condition, and initiates time-delayed shutdown	Red light flashing or solid based on condition
Bike rack deployed indicator	Detects bike rack position	Dash center	Indicates bike rack not being in fully stowed position	Amber or red light

TABLE 6 (Transit Coach)
Transit Bus Instruments and Alarms

Device	Description	Location	Function	Visual/Audible
HV charging system indicator (ESS)	Detects charging system status	Dash center	Indicates when bus is connected to off-board charger and ESS is accepting charge	Visual
State of charge indicator	Gauge, graduated based on SoC	Dash center	Indicates SoC of ESS	Visual
Regenerative braking indicator	Detects status	Dash center	Indicates when regenerative braking is being used	Visual
State of charge	Gauge, graduated based on SoC	Dash center	Indicates traction batteries SoC	
Turntable	Detects status	Dash center	Warning indication for hinge locking	Audible and amber warning and red light if locked
Turntable	Interlock momentary switch	Side console	Momentarily release interlock brakes due to overangled condition	

1. Indicate area by drawing. Break up switch control from indicator lights.

TS 44.6 Driver Foot Controls

Accelerator and brake pedals shall be designed for ankle motion. Foot surfaces of the pedals shall be faced with wear-resistant, nonskid, replaceable material.

TS 44.6.1 Pedal Angle

The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 37 to 50 deg at the point of initiation of contact and extend downward to an angle of 10 to 18 deg at full throttle.

The location of the brake and accelerator pedals shall be determined by the manufacturer, based on space needs, visibility, lower edge of windshield and vertical H-point.

TS 44.6.2 Pedal Dimensions and Position

The floor-mounted accelerator pedal shall be 10 to 12 in. long and 3 to 4 in. wide. Clearance around the pedal must allow for no interference precluding operation.

The accelerator and brake pedals shall be positioned such that the spacing between them, measured at the heel of the pedals, is between 1 and 2 in. Both pedals should be located approximately on the same plane coincident to the surface of the pedals.

TS 44.7 Brake and Accelerator Pedals

Brake Pedal

Non-adjustable brake pedal.

TS 44.8 Driver Foot Switches

Floor-Mounted Foot Control Platform

The angle of the turn signal platform shall be determined from a horizontal plane, regardless of the slope of the cab floor. The turn signal platform shall be angled at a minimum of 10 deg and a maximum of 37 deg. It shall be located no closer to the seat front than the heel point of the accelerator pedal.

Turn Signal Controls

Turn signal controls shall be floor-mounted, foot-controlled, water-resistant, heavy-duty, momentary contact switches.

Foot Switch Control

The control switches for the turn signals shall be mounted on an inclined, floor-mounted stainless steel enclosure or metal plate mounted to an incline integrated into the driver's platform, located to the left of the steering column. The location and design of this enclosure shall be such that foot room for the operator is not impeded. The inclined mounting surface shall be skid-resistant. All other signals, including high beam and public address system, shall be in approved locations.

The foot switches shall be UL-listed, heavy-duty type, of a rugged, corrosion-resistant metal construction. The foot switches for the directional signals shall be momentary type, while those for the PA system and the high beam shall be latching type. The spacing of the switches shall be such that inadvertent simultaneous deflection of switches is prevented.

Other Floor-Mounted Controls

The following may be floor mounted, momentary or latching, as identified by the Agency:

- hazard
- silent alarm
- PA system

TS 45. Driver's Amenities

TS 45.1 Coat Hanger

Coat Hook

A hook and loop shall be provided to secure the driver's coat.

TS 45.2 Drink Holder

No drink holder.

TS 45.3 Storage Box

Storage Box

An enclosed driver storage area shall be provided with a positive latching door and/or lock. The minimum size is 2750 cu in.

TS 46. Windshield Wipers and Washers

TS 46.1 Windshield Wipers

The bus shall be equipped with a windshield wiper for each half of the windshield. At 60 mph, no more than 10 percent of the wiped area shall be lost due to windshield wiper lift. For two-piece windshields, both wipers shall park along the center edges of the windshield glass. For single-piece windshields, wipers shall park along the bottom edge of the windshield. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service. The fastener that secures the wiper arm to the drive mechanism shall be corrosion-resistant.

Intermittent Wiper with Variable Control

A variable-speed feature shall be provided to allow adjustment of wiper speed for each side of the windshield between approximately five and 25 cycles per minute.

Non-Synchronized Wipers

For non-synchronized wipers, separate controls for each side shall be supplied.

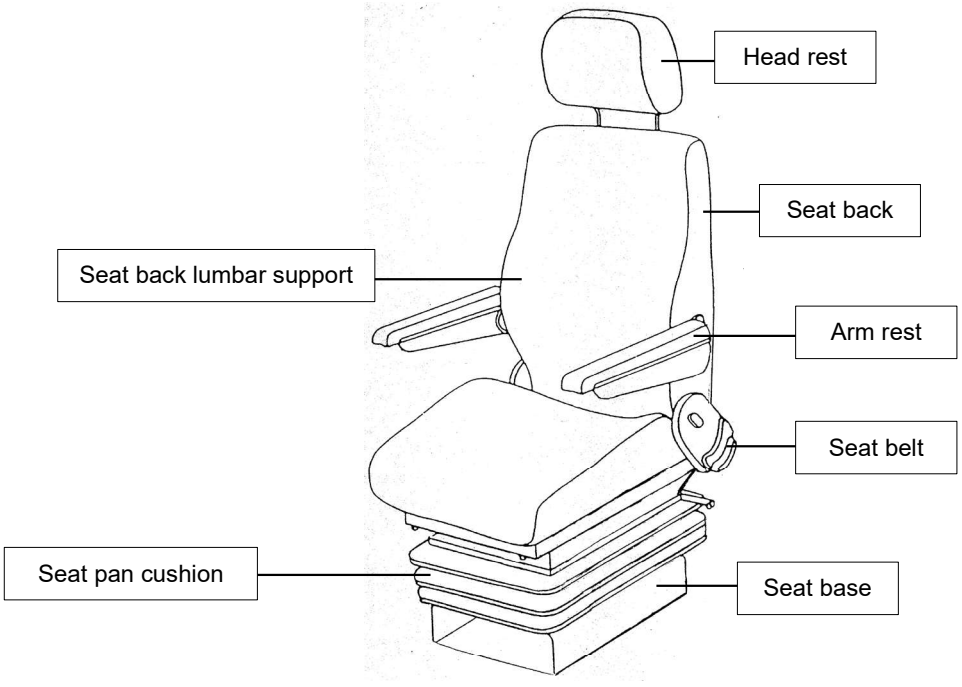
TS 46.2 Windshield Washers

The windshield washer system, when used with the wipers, shall deposit washing fluid evenly and completely wet the entire wiped area.

The windshield washer system shall have a minimum 3-gallon reservoir, located for easy refilling from outside the bus. Reservoir pumps, lines and fittings shall be corrosion-resistant and must include a means to determine fluid level.

TS 47. Driver's Seat

FIGURE 5
Driver's Seat



TS 47.1 Dimensions

The driver's seat shall be comfortable and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus.

TS 47.1.1 Seat Pan Cushion Length

Measurement shall be from the front edge of the seat pan to the rear at its intersection with the seat back. The adjustment of the seat pan length shall be no less than 16.5 in. at its minimum length and no more than 20.5 in. at its maximum length.

SP 9.1.1 Seat Pan Cushion Height

Dimensions

Measurement shall be from the cab floor to the top of the level seat at its center midpoint. The seat shall adjust in height from a minimum of 14 in., with a minimum 6 in. vertical range of adjustment.

TS 47.1.2 Seat Pan Cushion Slope

Measurement is the slope of the plane created by connecting the two high points of the seat, one at the rear of the seat at its intersection with the seat back and the other at the front of the seat just before it waterfalls downward at the edge. The slope can be measured using an inclinometer and shall be stated in degrees of incline relative to the horizontal plane (0 deg). The seat pan shall adjust in its slope from no less than plus 12 deg (rearward "bucket seat" incline) to no less than minus 5 deg (forward slope).

TS 47.1.3 Seat Base Fore/Aft Adjustment

Measurement is the horizontal distance from the heel point to the front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (approximately 15 in.). On all low-floor buses, the seat base shall travel horizontally a minimum of 9 in. It shall adjust no closer to the heel point than 6 in. On all high-floor buses, the seat base shall travel a minimum of 9 in. and adjust no closer to the heel point than 6 in.

TS 47.1.4 Seat Pan Cushion Width

Measurement is the horizontal distance across the seat cushion. The seat pan cushion shall be 17 to 21 in. across at the front edge of the seat cushion and 20 to 23 in. across at the side bolsters.

TS 47.1.5 Seat Suspension

The driver's seat shall be appropriately dampened to support a minimum weight of 380 lb. The suspension shall be capable of dampening adjustment in both directions**.**

Rubber bumpers shall be provided to prevent metal-to-metal contact.

TS 47.1.6 Seat Back

Width

Measurement is the distance between the outermost points of the front of the seat back, at or near its midpoint in height. The seat back width shall be no less than 19 in. Seat back will include dual recliner gears on both sides of the seat.

Height

Standard height seat back.

TS 47.1.7 Headrests

Adjustable headrest.

TS 47.1.8 Seat Back Lumbar Support

Measurement is from the bottom of the seat back at its intersection with the seat pan to the top of the lumbar cushioning. The seat back shall provide adjustable-depth lumbar back support with three individual operating lumbar cells within a minimum range of 7 to 11 in.

TS 47.1.9 Seat Back Angle Adjustment

The seat back angle shall be measured relative to a level seat pan, where 90 deg is the upright position and 90 deg-plus represents the amount of recline.

The seat back shall adjust in angle from a minimum of no more than 90 deg (upright) to at least 105 deg (reclined), with infinite adjustment in between.

TS 47.2 Seat Belt

The belt assembly should be an auto-locking retractor (ALR). All seat belts should be stored in automatic retractors. The belts shall be mounted to the seat frame so that the driver may adjust the seat without resetting the seat belt.

The seat and seatbelt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210.

Lap and Shoulder (Three-Point) Seat Belt

Seat belts shall be provided across the driver's lap and diagonally across the driver's chest. The driver shall be able to use both belts by connecting a single buckle on the right side of the seat cushion. Three-point seatbelts must be emergency locking retractor (ELR) in design.

Adjustable-height D-ring.

Orange three-point seatbelt webbing.

Lap Belt Length

72 in.

The lap belt assembly shall be a minimum of 72 in. in length.

TS 47.3 Adjustable Armrest

No armrests.

TS 47.4 Seat Control Locations

While seated, the driver shall be able to make seat adjustments by hand without complexity, excessive effort or being pinched. Adjustment mechanisms shall hold the adjustments and shall not be subject to inadvertent changes.

TS 47.5 Seat Structure and Materials

Cushions

Cushions shall be fully padded with at least 3 in. of materials in the seating areas at the bottom and back.

Cushion Materials

Open-cell polyurethane (FMVSS 302).

TS 47.6 Pedestal

Powder-coated steel.

TS 47.7 Mirrors

TS 47.7.1 Exterior Mirrors

The bus shall be equipped with corrosion-resistant, outside rearview mirrors mounted with stable supports to minimize vibration. Mirrors shall be firmly attached to the bus to minimize vibration and to prevent loss of adjustment with a breakaway mounting system. Mirrors shall permit the driver to view the roadway along the sides of the bus, including the rear wheels. Mirrors should be positioned to prevent blind spots.

Mirrors shall retract or fold sufficiently to allow bus washing operations but avoid contact with windshield.

Exterior mirrors shall be installed with a breakaway mounting system.

Spring-loaded mirror heads auto return.

DEFAULT

Flat Mirrors on Both Sides

The bus shall be equipped with two flat outside mirrors, each with not less than 50 sq in. of reflective surface. The mirrors shall be located so as to provide the driver a view to the rear along both sides of the bus and shall be adjustable both in the horizontal and vertical directions to view the rearward scene. The roadside rearview mirror shall be positioned so that the driver's line of sight is not obstructed.

ALTERNATIVE

Combination of flat and convex mirrors referred to as transit-specific.

Curbside Mirrors

The curbside rearview mirror shall be mounted so that its lower edge is no less than 76 in. above the street surface. A lower mount may be required due to mirror configuration requests.

Remote Adjustment of Curbside Mirror

The driver shall be able to adjust the curbside mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

ALTERNATIVE

Heated and Remote Mirrors

The heaters shall be energized whenever the driver's heater and/or defroster is activated or activated independently.

Street-Side Mirrors

ALTERNATIVE

Remote Adjustment of Curbside Mirror

The driver shall be able to adjust the street-side mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

ALTERNATIVE

Heated Street-Side Mirrors

The street-side mirrors shall have heaters that energize whenever the driver's heater and/or defroster is activated, or can be activated independently.

ALTERNATIVE

Mirrors with external mounted turn signal, both sides.

TS 47.7.2 Interior Mirrors

Mirrors shall be provided for the driver to observe passengers throughout the bus without leaving the seat and without shoulder movement. The driver shall be able to observe passengers in the front/entrance and rear/exit areas (if applicable), anywhere in the aisle, and in the rear seats.

WINDOWS

TS 48. General

Use with 29/30 ft length: A minimum of 6000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

Use with 35 ft length: A minimum of 8000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

Use with 40 ft length: A minimum of 10,000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

Use with 45 ft length: A minimum of 12,000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

Use with 60 ft length: A minimum of 16,000 sq in. of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

TS 49. Windshield

The windshield shall permit an operator's field of view as referenced in SAE J1050. The vertically upward view shall be a minimum of 14 deg, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3½ ft high no more than 2 ft in front of the bus. The horizontal view shall be a minimum of 90 deg above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90 deg requirement, provided that the divider does not exceed a 3 deg angle in the operator's field of view. Windshield pillars shall not exceed 10 deg of binocular

obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded-in-place windshields shall not be used. Winglets may be bonded.

TS 49.1 Glazing

The windshield glazing material shall have a ¼ in. nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping AS-1 and the recommended practices defined in SAE J673.

Shaded Band

The upper portion of the windshield above the driver's field of view shall have a dark, shaded band and marked AS-3, with a minimum luminous transmittance of 5 percent when tested in accordance to ASTM D1003.

DEFAULT

Two-piece windshield.

ALTERNATIVE

One-piece windshield.

TS 50. Driver's Side Window

The driver's side window shall be the sliding type, requiring only the rear half of the sash to latch upon closing, and shall open sufficiently to permit the seated operator to easily adjust the street-side outside rearview mirror. When in an open position, the window shall not rattle or close during braking. This window section shall slide in tracks or channels designed to last the service life of the bus. The operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single-density tint.

The driver's view, perpendicular through the operator's side window glazing, should extend a minimum of 33 in. (840 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 26 in. (560 mm) above the operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.

The driver's side window glazing material shall have a ¼ in. nominal thickness tempered safety glass conforming to the requirements of ANSI Z26.1-1996 Test Grouping AS-2 and the recommended practices defined in SAE J673.

The design shall prevent sections from freezing closed in the winter. Light transmittance shall be 75 percent on the glass area below 53 in. from the operator platform floor. On the top-fixed-over-bottom-slider configuration, the top fixed area above 53 in. may have a maximum 5 percent light transmittance.

DEFAULT

Standard Driver's Side Window, Traditional Frame

Agency to choose from the following options:

- full slider
  - egress
  - non-egress
- top fixed over bottom slider
  - egress
  - non-egress

ALTERNATIVE

Hidden Frame (Flush "Euro-Look") Driver's Side Window

Agency to choose from the following options:

- full slider
  - egress
  - non-egress
- top fixed over bottom slider
  - egress
  - non-egress

ALTERNATIVE

Quick Change Operator's Side Window

Glazing in the window assembly shall be replaced without removing the window from its installed position on the bus or manipulation of the rubber molding surrounding the glazing. The glazing shall be held in place mechanically by a formed metal extruded ring constructed to last the life of the vehicle.

ALTERNATIVE

Standard Driver's Side Window, Traditional Frame

Agency to choose from the following options:

- full slider
  - egress
  - non-egress
- top fixed over bottom slider
  - egress
  - non-egress

TS 51. Side Windows

TS 51.1 Configuration

Side windows shall not be bonded in place, but shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. All aluminum and steel material will be treated to prevent corrosion.

TS 51.2 Emergency Exit (Egress) Configuration

Minimum Egress

All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.

DEFAULT

Standard Passenger Side Window Configurations

Agency to choose from the following options:

- traditional frame
  - full fixed
  - openable windows with inward-opening transom panels
  - openable windows with sliding transom panels
  - openable windows with a fixed transom panel and sliding lower panels
  - openable windows with full-height sliding panels
- hidden frame (flush “Euro-look”)
  - full fixed
  - openable windows with inward-opening transom panels.

ALTERNATIVE

Quick Change Passenger Side Windows

Glazing in the window assembly shall be replaced without removing the window from its installed position on the bus or manipulation of the rubber molding surrounding the glazing. The glazing shall be held in place mechanically by a formed metal extruded ring constructed to last the life of the vehicle.

DEFAULT

Traditional Frame

Agency to choose from the following options:

- full fixed
- openable windows with inward-opening transom panels
- openable windows with sliding transom panels
- openable windows with a fixed transom panel and sliding lower panels
- openable windows with full-height sliding panels

ALTERNATIVE

Hidden Frame (Seamless)

Agency to choose from the following options:

- full fixed
- openable windows with inward-opening transom panels

TS 51.3 Configuration

Fixed Side Windows

All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.

TS 51.4 Materials

Safety Glass Glazing Panels

Side windows glazing material shall have a minimum of 3/16 in. nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 and the recommended practices defined in SAE J673.

Windows on the bus sides and in the rear door shall be tinted. The maximum solar energy transmittance shall not exceed 37 percent, as measured by ASTM E-424. Luminous transmittance shall be measured by ASTM D-1003. Windows over the destination signs shall not be tinted.

Glazing color shall be gray. Transmissivity range shall be 8%-18%.

Safety Glass Glazing Panels

Side windows glazing material shall have a minimum of 3/16 in. nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1 Test Grouping 2 and the recommended practices defined in SAE J673.

> **NOTE:** All glass treatments must be permanent, within the glass and/or in the center membrane. Surface films are not permitted.

SHGC and light transmission performance shall be defined by the National Fenestration Rating Council.

TS 51.5 Rear Window

There is no requirement for rear window.

However if a rear window is inherent to the design of the vehicle then the manufacturer must conform to the rear window requirement specification below.

Rear Window Requirement

The rear window shall be glazed with the same material (including anti-vandalism provision if required) and tint as side windows. The glazing shall be set in rubber channels or be push-out type to meet FMVSS 217. If push-out type, it shall be one-piece, rugged sash design, meeting specifications for side windows.

HEATING, VENTILATING AND AIR CONDITIONING

TS 52. Capacity and Performance

The HVAC climate control system shall be capable of controlling the temperature and maintaining the humidity levels of the interior of the bus as defined in the following paragraphs.

DEFAULT

HVAC equipped. See below for configuration.

DEFAULT

Allow Either Roof- or Rear-Mounted HVAC Unit

The HVAC unit may either be roof or rear-mounted. Note that a rear-mounted unit will preclude a rear window and that the term “roof-mounted unit” includes units mounted on top of or beneath the roof surface.

ALTERNATIVE (ARTIC)

Require roof- and rear-mounted HVAC unit (articulated buses).

ALTERNATIVE (ARTIC)

Require roof- mounted HVAC units in both bus sections (articulated buses).

ALTERNATIVE

AC or DC electrically driven A/C system with hermetic compressor(s), condenser fan and evaporator blower motors.

With the bus running at the design operating profile with corresponding door opening cycle, and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall control the average passenger compartment temperature within arrange between 65 and 80 °F, while maintaining the relative humidity to a value of 50 percent or less. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 40 to 95 °F and at any ambient relative humidity levels between 5 and 50 percent. Demonstrate this requirement after first reaching a stabilized interior temperature of 70 ±3 °F with full passenger and solar load.

When the bus is operated in outside ambient temperatures of 95 to 115 °F, the interior temperature of the bus shall be permitted to rise 0.5 °F for each degree of exterior temperature in excess of 95 °F.

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

Capacity and Performance Requirements

The air conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110 to 90 °F in less than 20 minutes after system startup in a 100 °F ambient temperature. During the cooldown period, the refrigerant pressure shall not exceed safe high-side pressures, and the condenser discharge air temperature, measured 6 in. from the surface of the coil, shall be less than 45 °F above the condenser inlet air temperature. The appropriate solar load as recommended in the APTA “Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System,” representing 4 p.m. on Aug. 21, shall be used. There shall be no passengers on board, and the doors, windows and fresh air opening shall be closed.

ALTERNATIVE

R134a

The air conditioning system shall meet these performance requirements using R134a.

ALTERNATIVE

R407C

The air conditioning system shall meet these performance requirements using R407C.

TS 53. Controls and Temperature Uniformity

The HVAC system excluding the driver's heater/defroster shall be centrally controlled with an advanced electronic/diagnostic control system with provisions for extracting/reading data. The system shall be compliant with J1939 Communication Protocol for receiving and broadcasting of data.

HVACs that use coolant pumps for driver's defroster/heat shall be sized for the required flow and be brushless, having a minimum maintenance-free service life for both the brushless motor and the pump of at least 40,000 hours at full power.

ALTERNATIVE

Fully Automatic Climate Control System

The climate control system shall be fully automatic and control the interior average temperature to within ±2 °F of specified temperature control setpoint.

ALTERNATIVE

Manually Adjustable Temperature Control Setpoint

The climate control system shall have the provision to allow the driver to adjust the temperature control setpoint at a minimum of between 68 and 72 °F. From then on, all interior climate control system requirements shall be attained automatically, unless readjusted by the driver.

The driver shall have full control over the defroster and driver's heater. The driver shall be able to adjust the temperature in the driver's area through air distribution and fans. The interior climate control system shall switch automatically to the ventilating mode if the refrigerant compressor or condenser fan fails.

Interior temperature distribution shall be uniform to the extent practicable to prevent hot and/or cold spots. After stabilization with doors closed, the temperatures between any two points in the passenger compartment in the same vertical plane, and 6 to 72 in. above the floor, shall not vary by more than 5 °F with doors closed. The interior temperatures, measured at the same height above the floor, shall not vary more than ±5 °F from the front to the rear from the average temperature determined in accordance with APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System." Variations of greater than ±5 °F will be allowed for limited, localized areas provided that the majority of the measured temperatures fall within the specified requirement.

TS 53.1 Auxiliary Heater

DEFAULT

No auxiliary heater.

TS 53.2 Load Shedding and Derating

Optional Multistage Load Shedding or Derating

HVAC control must include a method to provide multistage load shedding when required to conserve battery power. The HVAC system may be operated with reduced performance to allow the bus to operate when the high voltage batteries are below critical levels.

TS 54. Air Flow

TS 54.1 Passenger Area

The cooling mode of the interior climate control system shall introduce air into the bus at or near the ceiling height at a minimum rate of 25 cubic feet per minute (cfm) per passenger based on the standard configuration bus carrying a number of passengers equal to 150 percent of the seated load. Airflow shall be evenly distributed throughout the bus, with air velocity not exceeding 100 ft per minute on any passenger. The ventilating mode shall provide air at a minimum flow rate of 20 cfm per passenger.

Airflow may be reduced to 15 cfm per passenger (150 percent of seated load) when operating in the heating mode. The fans shall not activate until the heating element has warmed sufficiently to ensure at least 70 °F air outlet temperature. The heating air outlet temperature shall not exceed 120 °F under any normal operating conditions.

The climate control blower motors and fan shall be designed such that their operation complies with the interior noise level requirements.

DEFAULT

No "Fresh Air" Requirements

To be used by agencies with an operating profile where the door opening cycle results in effectively providing an adequate "fresh air" mixture.

TS 54.2 Driver's Area

The bus interior climate control system shall deliver at least 100 cfm of air to the driver's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shutdown of the airflow. Airflow in the heating mode shall be reduced proportionally to the reduction of airflow into the passenger area. The windshield defroster unit shall meet the requirements of SAE J382, "Windshield Defrosting Systems Performance Requirements," and shall have the capability of diverting heated air to the driver's feet and legs. The defroster or interior climate control system shall maintain visibility through the driver's side window.

TS 54.3 Controls for the Climate Control System (CCS)

The controls for the driver's compartment for heating, ventilation and cooling systems shall be integrated and shall meet the following requirements:

- The heat/defrost system fan shall be controlled by a separate switch that has an "off" position and at least two positions for speed control. All switches and controls shall preclude the possibility of clothing becoming entangled, and shields shall be provided, if required. If the fans are approved by the Agency, an "on/off" switch shall be located to the right of or near the main defroster switch.

- A manually operated control valve shall control the coolant flow through the heater core.
- If a cable-operated manual control valve is used, then the cable length shall be kept to a minimum to reduce cable seizing. Heater water control valves shall be “positive” type, closed or open. The method of operating remote valves shall require the concurrence of the Agency project manager.

TS 54.4 Driver’s Compartment Requirements

A separate heating, ventilation and defroster system for the driver’s area shall be provided and shall be controlled by the driver. The system shall meet the following requirements:

- The heater and defroster system shall provide heating for the driver and heated air to completely defrost and defog the windshield, driver’s side window and the front door glasses in all operating conditions. Fan(s) shall be able to draw air from the bus body interior and/or exterior through a control device and pass it through the heater core to the defroster system and over the driver’s feet. A minimum capacity of 100 cfm shall be provided. The driver shall have complete control of the heat and fresh airflow for the driver’s area.
- The defroster supply outlets shall be located at the lower edge of the windshield. These outlets shall be durable and shall be free of sharp edges that can catch clothes during normal daily cleaning. The system shall be such that foreign objects such as coins or tickets cannot fall into the defroster air outlets. Adjustable ball vents or louvers shall be provided at the left of the driver’s position to allow direction of air onto the side windows.

A ventilation system shall be provided to ensure driver comfort and shall be capable of providing fresh air in both the foot and head areas. Vents shall be controllable by the driver from the normal driving position. Decals shall be provided, indicating “operating instructions” and “open” and “closed” positions. When closed, vents shall be sealed to prevent the migration of water or air into the bus.

TS 54.5 Driver’s Cooling

A separate fan unit shall provide 100 cfm of air to the driver’s area through directionally adjustable nozzles and an infinitely variable fan control, both of which shall be located above and ahead of the driver.

Driver’s booster blower.

TS 55. Air Filtration

Air shall be filtered before entering the AC system and being discharged into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.1 requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service.

Cleanable Filters

Air filters shall be cleanable.

TS 56. Roof Ventilators

Each ventilator shall be easily opened and closed manually. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. The ventilator shall cover an opening area no less than 425 sq in. and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than 4 in.,

or with all four edges raised simultaneously to a height of no less than 3½ in. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator(s) shall be sealed to prevent entry of water when closed.

DEFAULT

One Roof Ventilator

One ventilator shall be provided in the roof of the bus.

ALTERNATIVE

Two Roof Ventilators

Two roof ventilators shall be provided in the roof of the bus, one approximately over or just forward of the front axle and the other approximately over the rear axle.

ALTERNATIVE

Three Roof Ventilators

(Used in articulated buses.)

TS 57. Maintainability

Manually controlled shutoff valves in the refrigerant lines shall allow isolation of the compressor and dehydrator filter for service. To the extent practicable, self-sealing couplings using O-ring seals shall be used to break and seal the refrigerant lines during removal of major components, such as the refrigerant compressor. Shutoff valves may be provided in lieu of self-sealing couplings. The condenser shall be located to efficiently transfer heat to the atmosphere and shall not ingest air warmed above the ambient temperature by the bus mechanical equipment, or to discharge air into any other system of the bus. The location of the condenser shall preclude its obstruction by wheel splash, road dirt or debris. HVAC components located within 6 in. of floor level shall be constructed to resist damage and corrosion.

DEFAULT

High and low refrigerant pressure electronic gauges to be located in the return air area.

TS 58. Entrance/Exit Area Heating

No requirements for entrance/exit area heating.

TS 59. Floor-Level Heating

TS 59.1 Transit Coach

No requirements for floor-level heating.

TS 59.2 Commuter Coach

There is no requirement for entrance/exit area heating and/or wall heating. The only requirement is to supply heated air through the existing HVAC system installed on the vehicle.

EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING

TS 60. Design

The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria. The exterior and body features, including grilles and louvers, shall be shaped to facilitate cleaning by automatic bus washers without snagging washer brushes. Water and dirt shall not be retained in or on any body feature to freeze or bleed out onto the bus after leaving the washer. The body and

windows shall be sealed to prevent leaking of air, dust or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus.

Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. When panels are lapped, the upper and forward panels shall act as a watershed. However, if entry of moisture into the interior of the vehicle is prevented by other means, then rear cap panels may be lapped otherwise. The windows, hatches and doors shall be able to be sealed. Accumulation of spray and splash generated by the bus's wheels shall be minimized on windows and mirrors.

TS 60.1 Materials

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

No requirement for protection against graffiti/vandalism for body material surfaces.

TS 60.2 Roof-Mounted Equipment (Transit Coach)

A nonskid, clearly marked walkway or steps shall be incorporated on the roof to provide access to equipment without damaging any system or bus paneling.

TS 61. Pedestrian Safety

Exterior protrusions along the side and front of the bus greater than ½ in. and within 80 in. of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors, cameras and required lights and reflectors are exempt from the protrusion requirement. Advertising frames shall protrude no more than ⅞ in. from the body surface. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize toeholds or handholds.

Exterior protrusions shall not cause a line-of-sight blockage for the driver.

TS 62. Repair and Replacement

TS 62.1 Side Body Panels (Transit Coach)

Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired in lengths not greater than 12.5 ft.

Standard attachment of side body panels.

TS 62.2 Side Body Panels (Commuter Coach)

Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired.

TS 63. Rain Gutters

Rain gutters shall be provided to prevent water flowing from the roof onto the passenger doors and driver's side window. When the bus is decelerated, the gutters shall not drain onto the windshield, driver's side window or door boarding area. Cross-sections of the gutters shall be adequate for proper operation.

TS 64. License Plate Provisions

Provisions shall be made to mount standard-size U.S./Canada license plates per SAE J686 on the rear of the bus. These provisions shall direct-mount or recess the license plates so that they can be cleaned by automatic bus-washing equipment without being caught by the brushes. The rear license plate provision shall be illuminated per SAE J587.

No front plate or holder provision is required.

TS 64.1 Rub rails

No requirement for rub rails.

TS 65. Fender Skirts

Features to minimize water spray from the bus in wet conditions shall be included in wheel housing design. Any fender skirts shall be easily replaceable. They shall be flexible if they extend beyond the allowable body width. Wheels and tires shall be removable with the fender skirts in place.

TS 66. Wheel Covers (Transit Coach)

Wheel covers not required.

TS 66.1 Splash Aprons

Standard Splash Aprons

Splash aprons, composed of ¼ in. minimum composition or rubberized fabric, shall be installed behind and/or in front of wheels as needed to reduce road splash and to protect underfloor components. The splash aprons shall extend downward to within 6 in. off the road surface at static conditions. Apron widths shall be no less than tire widths. Splash aprons shall be bolted to the bus understructure. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. The flexible portions of the splash aprons shall not be included in the road clearance measurements. Splash apron shall be installed as necessary to protect the wheelchair loading device from road splash. Other splash aprons shall be installed where necessary to protect bus equipment.

TS 67. Service Compartments and Access Doors

TS 67.1 Access Doors (Transit 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 maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. All access doors shall be retained in the open position by props or counterbalancing with overcenter or gas-filled springs with safety props and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems.

If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.

TS 67.2 Access Doors (Commuter Coach)

Conventional doors shall be used for the engine compartment area and for all auxiliary equipment compartments, including doors for checking the quantity and adding to the engine coolant, engine lubricant and transmission fluid. Access openings shall be sized for easy performance of tasks within the compartment, including tool operating space. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. All access doors shall be retained in the open position. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems.

If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.

TS 67.3 Access Door Latch/Locks

Requirement for Latches on Access Doors

Access doors larger than 100 sq in. in area shall be equipped with corrosion-resistant flush-mounted latches or locks except for coolant and fuel fill access doors. All such access doors that require a tool to open shall be standardized throughout the vehicle and will require a nominal 5/16 in. square male tool to open or lock.

Manufacturer shall provide a quantity of three access door latch/lock tools for each bus ordered.

TS 68. Bumpers

TS 68.1 Location

Bumpers shall provide impact protection for the front and rear of the bus with the top of the bumper being 27 in., ±2 in., above the ground. Bumper height shall be such that when one bus is parked behind another, a portion of the bumper faces will contact each other.

TS 68.2 Front Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 5 mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus's longitudinal centerline. The bumper shall return to its pre-impact shape within 10 minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4000 lb parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5 mph impacts into the corners at a 30 deg angle to the longitudinal centerline of the bus. The energy absorption system of the bumper shall be independent of every power system of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than 7 in.

The bumper shall be the manufacturers standard design and incorporate mounting provisions for an integrated bike rack.

TS 68.3 Rear Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 2 mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper 2 ft wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to 5 mph, over pavement discontinuities up to 1 in. high, and at accelerations up to 2 mph per second. The rear bumper shall protect the bus when impacted anywhere along its width by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4000 lb, at 4 mph parallel to or up to a 30 deg angle to the longitudinal centerline of the bus. The rear bumper shall be shaped to prevent unauthorized riders standing on the bumper. The bumper shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than 7 in.

TS 68.4 Bumper Material

Bumper material shall be corrosion-resistant and shall withstand repeated impacts of the specified loads without sustaining damage. These bumper qualities shall be sustained throughout the service life of the bus.

TS 69. Finish and Color

TS 69.1 Appearance

All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system Supplier prior to application of paint to ensure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting, where possible, to prevent corrosion. The bus shall be painted prior to installation of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.

Paint shall be applied smoothly and evenly with the finished surface free of visible dirt and the following other imperfections:

- blisters or bubbles appearing in the topcoat film
- chips, scratches or gouges of the surface finish
- cracks in the paint film
- craters where paint failed to cover due to surface contamination
- overspray
- peeling
- runs or sags from excessive flow and failure to adhere uniformly to the surface
- chemical stains and water spots
- dry patches due to incorrect mixing of paint activators
- buffing swirls

All exterior finished surfaces shall be impervious to diesel fuel, gasoline and commercial cleaning agents. Finished surfaces shall resist damage by controlled applications of commonly used graffiti-removing chemicals.

Proper adhesion between the basic surface and successive coats of the original paint shall be measured using an Elcometer adhesion tester as outlined in ASTM D4541-85. Adhesion shall be a minimum 300 ft-lb. The bus manufacturer shall supply test samples of the exterior surface for each step of the painting process that

may be subject to adhesion testing per ASTM G4541-87 and ASTM D4145-85. ASTM D4541-93 may be used for inspection testing during assembly of the vehicle.

Standard Contractor exterior paint finish quality.

DEFAULT

Base coat/clear coat paint system.

TS 70. Decals, Numbering and Signing

Energy storage and delivery systems shall be identified in accordance with federal, state and local requirements, codes and standards.

Agency-Specified

Monograms, numbers and other special signing shall be applied to the inside and outside of the bus as required. Signs shall be durable and fade-, chip- and peel-resistant. They may be painted signs, decals or pressure-sensitive appliqués. All decals shall be installed per the decal Supplier recommendations. Signs shall be provided in compliance with the ADA requirements defined in 49 CFR Part 38, Subpart B, 38.27.

TS 70.1 Passenger Information

ADA priority seating signs as required and defined by 49 CFR shall be provided to identify the seats designated for passengers with disabilities.

Requirements for a public information system in accordance with 49 CFR shall be provided.

TS 71. Exterior Lighting

All exterior lights shall be designed to prevent entry and accumulation of moisture or dust. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. Two hazard lamps at the rear of the bus shall be visible from behind when the engine service doors are opened. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer.

Commercially available LED-type lamps shall be used at all exterior lamp locations.

Standard Lamps

All LED lamps shall be standard installation of the OEM. The entire assembly shall be specifically coated to protect the light from chemical and abrasion degradation.

Standard Size

Size of LED lamps used for tail, brake and turn signal lamps shall be standard installation of OEM.

Front marker (clearance) lights along with lights located on the roof and sides of the bus shall have protective shields or be of the flush mount type to protect the lens against minor impacts.

TS 71.1 Backup Light/Alarm

Visible and audible warnings shall inform following vehicles or pedestrians of reverse operation. Visible reverse operation warning shall conform to SAE J593. Audible reverse operation warning shall conform to SAE J994 Type C or D.

TS 71.2 Doorway Lighting

Lamps at the front and rear passenger doorways (if applicable) shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than 1 footcandle (fc) for a distance of 3 ft outward from the outboard edge of the door threshold. The lights may be positioned above or below the lower daylight opening of the windows and shall be shielded to protect passengers' eyes from glare.

TS 71.3 Turn Signals

Standard Turn Signals

Turn-signal lights shall be provided on the front, rear, curb and street sides of the bus in accordance with federal regulations.

TS 71.4 Headlamps

Headlamps shall be designed for ease of replacement.

Standard Installation

Standard OEM headlamp installation shall be provided in accordance with federal regulations.

ALTERNATIVE

Daytime Running Lights

Headlamps shall incorporate a daytime running light feature.

LED

Headlamps shall be LED.

TS 71.5 Brake Lamps

TS 71.5.1 Transit Coach

Brake lamps shall be provided in accordance with federal regulations.

High and Center Mount Red Brake Lamp

Bus shall include red, high and center mount brake lamp(s) along the backside of the bus in addition to the lower brake lamps required under FMVSS. The high and center mount brake lamp(s) shall illuminate steadily with brake application. Agency to specify the size of the high and center mount brake lamp(s).

TS 71.5.2 Commuter Coach

Brake lamps shall be provided in accordance with federal regulations.

Bus shall include red, high and center mount brake lamp(s) along the back side of the bus in addition to the lower brake lamps required under FMVSS. The high and center mount brake lamp(s) shall illuminate steadily with brake application.

TS 71.6 Service Area Lighting (Interior and Exterior)

LED lamps shall be provided in the engine and all other compartments where service may be required to generally illuminate the area for night emergency repairs or adjustments. These service areas shall include, but not be limited to, the engine compartment, the communication box, junction/apparatus panels and passenger door operator compartments. Lighting shall be adequate to light the space of the service areas to levels needed to complete typical emergency repairs and adjustments. The service area lamps shall be suitable for the environment in which they are mounted.

Engine compartment lamps shall be controlled by a switch mounted near the rear start controls or in an approved location. All other service area lamps shall be controlled by switches mounted on or convenient to the lamp assemblies. Power to the service area lighting shall be programmable. Power shall latch on with activation of the switch and shall be automatically discontinued (timed out) after 30 minutes to prevent damage caused by inadvertently leaving the service area lighting switch in the “on” position after repairs are made.

INTERIOR PANELS AND FINISHES

TS 72. General Requirements

Materials shall be selected on the basis of maintenance, durability, appearance, safety, noise reduction, flammability and tactile qualities. Materials shall be strong enough to resist everyday abuse and be vandalism and corrosion resistant. Trim and attachment details shall be kept simple and unobtrusive. Interior trim shall be secured to avoid resonant vibrations under normal operational conditions.

Interior surfaces more than 10 in. 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. Any components and other electrical components within close proximity to these surfaces shall also be resistant to this cleaning method.

No requirement for anti-graffiti/vandalism surface treatments.

Internal surfaces, as possible, to be stainless steel or other resistant material.

TS 73. Interior Panels

Panels shall be easily replaceable and tamper-resistant. They shall be reinforced, as necessary, to resist vandalism and other rigors of transit bus service. Individual trim panels and parts shall be interchangeable to the extent practicable.

DEFAULT

Interior panel required to meet FMVSS 302.

ALTERNATIVE

Melamine-type material.

TS 73.1 Driver Area Barrier

TS 73.1.1 Transit Coach

A barrier or bulkhead between the driver and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. Location and shape must permit full seat travel and reclining possibilities that can accommodate the shoulders of a 95th-percentile male. The partition shall have a side return and stanchion to prevent passengers from reaching the driver by standing behind the driver's seat. The lower area between the seat and panel must be accessible to the driver. The partition must be strong enough in conjunction with the entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2 kg), microcomputer, public address amplifier, etc. The panel should be properly attached to minimize noise and rattles.

DEFAULT (TRANSIT COACH)

Wheel-Well-to-Ceiling Configuration of Driver's Barrier

The driver's barrier shall extend from the top of the wheel well to the ceiling the level of the seated driver and shall fit close to the bus-side windows and wall to prevent passengers from reaching the driver or the driver's personal effects.

ALTERNATIVE

Driver enclosure or door.

TS 73.1.2 Commuter Coach

A barrier or bulkhead between the driver and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. Location and shape must permit full seat travel and reclining possibilities that can accommodate the shoulders of a 95th-percentile male. The partition shall have a side return and stanchion to prevent passengers from reaching the driver by standing behind the driver's seat. The lower area between the seat and panel must be accessible to the driver. The partition must be strong enough in conjunction with the entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2 kg), microcomputer, public address amplifier, etc. The panel should be properly attached to minimize noise and rattles.

The driver's barrier shall extend from the floor area to the ceiling and from the bus wall to the first stanchion immediately behind the driver to provide security to the driver and to limit passenger conversation.

TS 73.2 Modesty Panels

Sturdy divider panels constructed of durable, unpainted, corrosion-resistant material complementing the interior shall be provided to act as both a physical and visual barrier for seated passengers.

Design and installation of modesty panels located in front of forward-facing seats shall include a handhold or grab handle along their top edge. These dividers shall be mounted on the sidewall and shall project toward the aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend from at least the window opening of the side windows, and those forward of

transverse seats shall extend downward to 1 and 1½ in. above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways, where applicable, shall provide no less than a 2½ in. clearance between the modesty panel and a fully open, inward opening door, or the path of a deploying flip-out ramp to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with grab rails if passenger assists are not provided by other means.

The modesty panel and its mounting shall withstand a static force of 250 lb applied to a 4 × 4 in. area in the center of the panel without permanent visible deformation.

TS 73.3 Front End

The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the driver's feet from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing at the front of the standee line area of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the driver's compartment shall be formed metal or composite material. Composite dash panels shall be reinforced as necessary, vandal-resistant and replaceable. All colored, painted and plated parts forward of the driver's barrier shall be finished with a surface that reduces glare. Any mounted equipment must have provision to support the weight of equipment.

TS 73.4 Rear Bulkhead

The rear bulkhead and rear interior surfaces shall be material suitable for exterior skin; painted and finished to exterior quality; or paneled with melamine-type material, composite, scratch-resistant plastic or carpeting and trimmed with stainless steel, aluminum or composite.

The rear bulkhead paneling shall be contoured to fit the ceiling, sidewalls and seat backs so that any litter or trash will tend to fall to the floor or seating surface when the bus is on a level surface. Any air vents in this area shall be louvered to reduce airflow noise and to reduce the probability of trash or liter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, then the panel shall be hinged or shall be able to be easily removed and replaced. Grilles where access to or adjustment of equipment is required shall be heavy duty and designed to minimize damage and limit unauthorized access.

TS 73.5 Headlining

Ceiling panels shall be made of durable, corrosion resistant, easily cleanable material. Headlining shall be supported to prevent buckling, drumming or flexing and shall be secured without loose edges. Headlining materials shall be treated or insulated to prevent marks due to condensation where panels are in contact with metal members. Moldings and trim strips, as required to make the edges tamperproof, shall be stainless steel, aluminum or plastic, colored to complement the ceiling material. Headlining panels covering operational equipment that is mounted above the ceiling shall be on hinges for ease of service but retained to prevent inadvertent opening.

TS 73.6 Fastening

Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Fasteners should be corrosion resistant. Panels and fasteners shall not be easily removable by passengers. Exposed interior fasteners should be minimized, and where required shall be tamper-resistant.

TS 73.7 Insulation

Any insulation material used between the inner and outer panels shall minimize the entry and/or retention of moisture. Insulation properties shall be unimpaired during the service life of the bus. Any insulation material used inside the engine compartment shall not absorb or retain oils or water and shall be designed to prevent casual damage that may occur during maintenance operations.

The combination of inner and outer panels on the sides, roof, wheel wells and ends of the bus, and any material used between these panels, shall provide a thermal insulation sufficient to meet the interior temperature requirements. The bus body shall be thoroughly sealed so that the driver or passengers cannot feel drafts during normal operations with the passenger doors closed.

FMVSS 302

Insulation shall meet the requirements of FMVSS 302.

TS 73.8 Floor Covering

The floor covering shall have a nonskid walking surface that remains effective in all weather conditions. The floor covering, as well as transitions of flooring material to the main floor and to the entrance and exit area, shall be smooth and present no tripping hazards. Seams shall be sealed/welded per manufacturer's specifications. The color and pattern shall be consistent throughout the floor covering. The standee line shall be approximately 2 in. wide and shall extend across the bus aisle and contrast with the rest of the floor covering.

Any areas on the floor that are not intended for standees, such as areas "swept" during passenger door operation, shall be clearly and permanently marked.

The floor shall be easily cleaned and shall be arranged to minimize debris accumulation.

A one-piece center strip shall extend from the vertical wall of the rear settee between the aisle sides of transverse seats to the standee line. If the floor is of a bi-level construction, then the center strip shall be one piece at each level. The covering between the center strip and the wheel housings may be separate pieces. At the rear door, however, a separate strip as wide as the door shall extend from the center strip to the outboard edge of the rear/exit area.

The floor under the seats shall be covered with smooth surface flooring material. The floor covering shall closely fit the sidewall in a fully sealed butt joint or extend to the top of the cove.

TS 73.9 Interior Lighting

The light source shall be located to minimize windshield glare, with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. The lighting system may be designed to form part of or the entire air distribution duct.

The lens material shall be translucent polycarbonate. Lenses shall be designed to effectively "mask" the light source. Lenses shall be sealed to inhibit incursion of dust and insects yet be easily removable for service. Access panels shall be provided to allow servicing of components located behind light panels. If necessary, the entire light fixture shall be hinged.

TS 73.10 Passenger Area Lighting

First Row Lights

The first light on each side (behind the driver and the front door) is normally turned on only when the front door is opened, in “night run” and “night park.” As soon as the door closes, these lights shall go out. These lights shall be turned on at any time if the switch is in the “on” position.

Dimming Second Row Lights

To help eliminate windshield reflection on suburban roads where street lighting is at a low level, the second light on each side, when “night run” or “night park” is selected, shall be controlled by the switch; off in “off” and on in “normal.” These lights shall be turned on at any time if the switch is in the “on” position.

All interior lighting shall be turned off whenever the vehicle is in reverse and the run switch is in the “on” position.

The interior lighting design shall require the approval of the Agency.

LED lights.

First Light Modules Dim/Extinguish When Front Door Is Closed

When the master switch is in the “run” or “night/run” mode, the first light module on each side of the coach shall automatically extinguish or dim when the front door is in the closed position and illuminate when the door is opened.

TS 73.11 Driver’s Area Lighting

The driver’s area shall have a light to provide general illumination, and it shall illuminate the half of the steering wheel nearest the driver to a level of 5 to 10 fc.

TS 73.12 Seating Area Lighting (Transit Coach)

The interior lighting system shall provide a minimum 15 fc illumination on a 1 sq ft plane at an angle of 45 deg from horizontal, centered 33 in. above the floor and 24 in. in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be 7 fc.

TS 73.13 Seating Area Lighting (Commuter Coach)

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. 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 in. (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 in. (1016 mm) apart. Total capacity shall be a minimum 109 cu ft (3 m^3) to allow for ample storage space for carry-on items.

Passenger service modules mounted on the underside of the parcel rack shall include individually controlled and adjustable LED passenger reading lights; an exit signal push button, red in color; and individual air distribution outlets. These outlets shall be adjustable from fully closed to fully open position. A minimum of

26 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 using 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.

TS 73.14 Vestibules/Doors Lighting (Transit Coach)

Floor surface in the aisles shall be a minimum of 10 fc, and the vestibule area a minimum of 4 fc with the front doors open and a minimum of 2 fc with the front doors closed. The front entrance area and curb lights shall illuminate when the front door is open and the master run switch is in the “lights” position. Rear exit area and curb lights shall illuminate when the rear door is unlocked.

TS 73.15 Vestibules/Doors Lighting (Commuter Coach)

Floor surface in the aisles shall be a minimum of 2 fc, and the vestibule area in accordance with ADA requirements.

TS 73.16 Step Lighting

Step lighting for the intermediate steps between lower and upper floor levels shall be a minimum of 4 fc and shall illuminate in all vehicle run positions. The step lighting shall be low profile to minimize tripping and snagging hazards for passengers and shall be shielded as necessary to protect passengers’ eyes from glare.

TS 73.17 Ramp Lighting (Transit Coach)

Exterior and interior ramp lighting shall comply with federal regulations.

TS 73.18 Turntable Lighting (Articulated Coach)

Lighting in the turntable can be reduced to 7 fc.

TS 73.19 Farebox/Card Reader Lighting

TS 73.19.1 Transit Coach

Farebox Light

A light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox. This light will automatically come on whenever the front doors are opened and the run switch is in the “night run” or “night park” position.

Card Reader Light

A light fixture shall be mounted in the ceiling above the card reader location. The fixture shall be capable of projecting a concentrated beam of light on the card reader. This light will automatically come on whenever the front doors are opened and the run switch is in the “night run” or “night park” position.

ALTERNATIVE (TRANSIT COACH)

Provide a farebox and card reader light.

TS 73.19.2 Commuter Coach

Farebox Light

A light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox. This light will automatically come on whenever the front doors are opened and the run switch is in the “night run” or “night park” position.

TS 74. Fare Collection

Space and structural provisions shall be made for installation of currently available fare collection devices, which shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The farebox shall not restrict access to the driver’s area, shall not restrict operation of driver controls, and shall not—either by itself or in combination with stanchions, transfer mounting, cutting and punching equipment, or route destination signs—restrict the driver’s field of view per SAE J1050. The location and mounting of the fare collection device shall allow use, without restriction, by passengers. The farebox location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the farebox shall be readable on a daily basis. The floor under the farebox shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the farebox.

Contractor shall provide fare collection installation layout to the Agency for approval.

Transfer mounting, cutting and punching equipment shall be located in a position convenient to the driver.

Agency will install its own farebox/card reader.

TS 75. Interior Access Panels and Doors (Transit Coach)

Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Access doors shall be hinged with gas props or overcenter springs, where practical, to hold the doors out of the mechanic’s way. Panels shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.

Access Doors with Locks

Access doors shall be secured with locks. The locks shall be standardized so that only one tool is required to open access doors on the bus.

TS 75.1 Floor Panels

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Flooring material at or around access openings shall be flush with the floor and shall be edge-bound with stainless steel or another material that is acceptable to the Agency to prevent the edges from coming loose. Access openings shall be asymmetrical so that reinstalled flooring shall be properly aligned. Fasteners shall tighten flush with the floor.

The number of special fastener tools required for panel and access door fasteners shall be minimized.

PASSENGER ACCOMMODATIONS

TS 76. Passenger Seating

TS 76.1 Arrangements and Seat Style (Transit Coach)

The passenger seating arrangement in the bus shall be such that seating capacity is maximized and in compliance to the following requirements.

Forward-Facing Seat Configuration

Passenger seats shall be arranged in a transverse, forward-facing configuration, except at the wheel housings and turntable, if applicable, where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at wheelchair securement areas and platforms (such as for fuel tank storage space).

TS 76.2 Rearward Facing Seats (Transit Coach)

Rearward facing seats not allowed.

TS 76.3 Turntable Seating (Articulated Coach)

Seats.

TS 76.4 Padded Inserts/Cushioned Seats (Transit Coach)

DEFAULT

Non-Padded Inserts, Unupholstered

The passenger seats shall be equipped with un-upholstered inserts throughout the bus.

TS 76.5 Seat Back Fitness

Back Insert Seat Configuration

The seat back insert thickness shall not exceed 1 in. in the knee room area.

TS 76.6 Drain Hole in Seats

Requirement for Drain Hole Provision in Seat Inserts

Provision, such as a small grommeted hole, to allow drainage shall be incorporated into seat insert. (Drain through hole, ¼ in. through hole, bottom seat only, one per seat.)

TS 76.7 Arrangements and Seat Style (Commuter Coach)

DEFAULT

Forward-Facing Seat Configuration

Passenger seats shall be arranged in forward-facing configuration with a minimum of 55 reclining and cushioned passenger seats. Contractor to provide seat layout to the Agency once the Agency has provided the seat manufacturer and model number.

TS 76.8 Hip-to-Knee Room

Hip-to-knee room measured from the center of the seating position, from the front of one seat back horizontally across the highest part of the seat to a vertical surface immediately in front, shall be a minimum of 26 in. At all seating positions in paired transverse seats immediately behind other seating positions, hip-to-knee room shall be no less than 27 in.

TS 76.9 Foot Room

Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 in. Seats immediately behind the wheel housings and modesty panels may have foot room reduced (Agency will approve acceptable dimensions).

TS 76.10 Aisles (Transit Coach)

The aisle between the seats shall be no less than 20 in. wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 in. at 32 in. above the floor (standing passenger hip height).

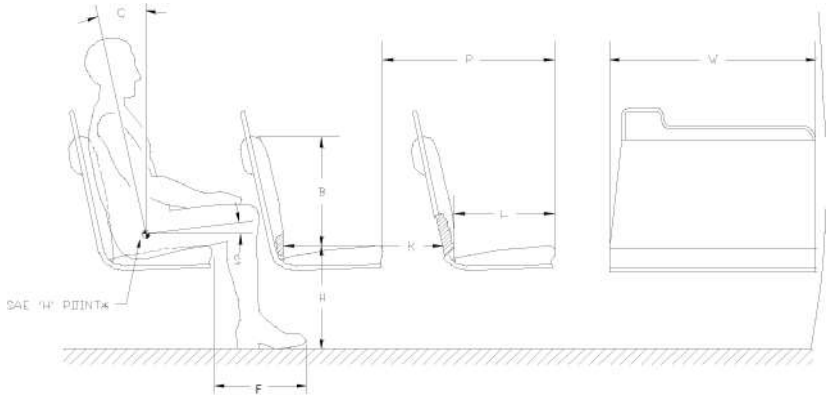
TS 76.11 Aisles (Commuter Coach)

The aisle between the seats shall be no less than 14 in. wide at seated passenger hip height.

TS 76.12 Dimensions (Transit Coach)

FIGURE 6

Seating Dimensions and Standard Configuration



Seat dimensions for the various seating arrangements shall have the dimensions as follows (refer to **Figure 6**):

- The width, W, of the two-passenger transverse seat shall be a minimum 35 in.
- The length, L, shall be 17 in., ±1 in.
- The seat back height, B, shall be a minimum of 15 in.
- The seat height, H, shall be 17 in., ±1 in. For the rear lounge (or settee) and longitudinal seats, and seats located above raised areas for storage of underfloor components, a cushion height of up to 18 in., ±2 in., will be allowed. This shall also be allowed for limited transverse seats, but only with the express approval of the Agency.
- Foot room = F.
- The seat cushion slope, S, shall be between 5 and 11 deg.
- The seat back slope, C, shall be between 8 and 17 deg.
- Hip to knee room = K.
- The pitch, P, is shown as reference only.

TS 76.13 Structure and Design (Transit Coach)

The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized and is completely free of obstructions to facilitate cleaning.

Seats, structures and restraints around the securement area should not infringe into the mobility device envelope or maneuverability.

The transverse seat structure shall be fully cantilevered from the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12 in. of the aisle shall be at least 10 in. above the floor.

In locations at which cantilevered installation is precluded by design and/or structure, other seat mounting may be allowed.

All transverse objects—including seat backs, modesty panels and longitudinal seats—in front of forward-facing seats shall not impart a compressive load in excess of 1000 lb onto the femur of passengers ranging in size from a 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at 0.05 to 0.015 seconds from initiation. Permanent deformation of the seat resulting from two 95th-percentile males striking the seat back during this 10g deceleration shall not exceed 2 in., measured at the aisle side of the seat frame at height H. The seat back should not deflect more than 14 in., measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.

The seat assembly shall withstand static vertical forces of 500 lb applied to the top of the seat cushion in each seating position with less than ¼ in. permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 lb evenly distributed along the top of the seat back with less than ¼ in. permanent deformation in the seat or its mountings. The seat backs at the aisle position and at the window position shall withstand repeated impacts of two 40 lb sandbags without visible deterioration. One sandbag shall strike the front 40,000 times and the other sandbag shall strike the rear 40,000 times. Each sandbag shall be suspended on a 36 in. pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10 and 12 in. Seats at both seating positions shall withstand 4000 vertical drops of a 40 lb sandbag without visible deterioration. The sandbag shall be dropped 1000 times each from heights of 6, 8, 10 and 12 in. Seat cushions shall withstand 100,000 randomly positioned 3½ in. drops of a squirming, 150 lb, smooth-surfaced, buttocks-shaped striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.

The back of each transverse seat shall incorporate a handhold no less than ⅞ in. in diameter for standees and seat access/egress. The handhold shall not be a safety hazard during severe decelerations. The handhold shall extend above the seat back near the aisle so that standees shall have a convenient vertical assist, no less than 4 in. long, that may be grasped with the full hand. This handhold shall not cause a standee using this assist to interfere with a seated 50th-percentile male passenger. The handhold shall also be usable by a 5th-percentile female, as well as by larger passengers, to assist with seat access/egress for either transverse seating position. The upper rear portion of the seat back and the seat back handhold immediately forward of transverse seats shall be padded and/or constructed of energy-absorbing materials. During a 10g deceleration of the bus, the HIC number (as defined by SAE J211a) shall not exceed 400 for passengers ranging in size from a 5th percentile female through a 95th percentile male.

The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where a vertical assist is provided.

Longitudinal seats shall be the same general design as transverse seats but without seat back handholds. Longitudinal seats may be mounted on the wheelhouses. Armrests shall be included on the ends of each set of longitudinal seats except on the forward end of a seat set that is immediately to the rear of a transverse seat, the driver's barrier or a modesty panel, when these fixtures perform the function of restraining passengers from sliding forward off the seat. Armrests are not required on longitudinal seats located in the wheelchair parking area that fold up when the armrest on the adjacent fixed longitudinal seat is within 3½ in. of the end of the seat cushion. Armrests shall be located from 7 to 9 in. above the seat cushion surface. The area between the armrest and the seat cushion shall be closed by a barrier or panel. The top and sides of the armrests shall have a minimum width of 1 in. and shall be free from sharp protrusions that form a safety hazard.

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

TS 76.14 Structure and Design (Commuter Coach)

Passenger seats shall be arranged in a transverse, forward-facing configuration.

No more than 10 seated positions shall be lost on any bus configuration to accommodate two wheelchair passengers occupying the securement positions.

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.

Seats shall be commuter coach reclining seats. Seat frames shall be constructed of high-strength, fatigue-resistant, welded steel with a durable powder-coated, corrosion-resistant colored finish that 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 a minimum of 1 in. to a maximum of 5 in. (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 a minimum of 36 in. and a maximum of 40.50 in. (1029 mm). Aisle shall not be less than 14 in. (356 mm) wide.

TS 76.15 Construction and Materials (Transit Coach)

Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners. Coloring shall be consistent throughout the seat

material, with no visually exposed portion painted. Any exposed metal touching the sides or the floor of the bus shall be stainless steel. The seat, pads and cushions shall be contoured for individuality, lateral support and maximum comfort and shall fit the framework to reduce exposed edges.

The minimum radius of any part of the seat back, handhold or modesty panel in the head or chest impact zone shall be a nominal ¼ in. The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy-absorbing materials to provide passenger protection and, in a severe crash, to allow the passenger to deform the seating materials in the impact areas. Complete seat assemblies shall be interchangeable to the extent practicable.

TS 76.16 Construction and Materials (Commuter Coach)

Seat cushions shall be supported by steel serpentine springs. Seat covering shall be high-quality wool fabric or vinyl. Wool fabric shall be tested to a minimum of 60,000 rubs per the Wyzendeek test method.

Seat foam padding shall be polyurethane. Seat upholstery shall be able to be removed with ease for cleaning/replacement purposes.

Agency to select seat fabric.

TS 77. Passenger Assists (Transit Coach)

Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for the safety of standees and for ingress/egress. Passenger assists shall be convenient in location, shape and size for both the 5th-percentile female standee and the 95th-percentile male standee. Starting from the entrance door and moving anywhere in the bus and out the exit door, a vertical assist shall be provided either as the vertical portion of the seat back assist or as a separate item so that a 5th-percentile female passenger may easily move from one assist to another using one hand and then the other without losing support. All handholds and stanchions at the front doorway, around the farebox, and at interior steps for bi-level designs shall be powder-coated in a high-contrast yellow color.

The forward-most vertical stanchions on either side of the aisle immediately behind the driver's area shall be a stainless steel finish.

TS 77.1 Assists (Transit Coach)

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1½ in. or shall provide an equivalent gripping surface with no corner radii less than ¼ in. All passenger assists shall permit a full hand grip with no less than 1½ in. of knuckle clearance around the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Seat handholds may be of the same construction and finish as the seat frame. Door-mounted passenger assists shall be of anodized aluminum, stainless steel or powder-coated metal. Connecting tees and angles may be powder-coated metal castings. Assists shall withstand a force of 300 lb applied over a 12 in. lineal dimension in any direction normal to the assist without permanent visible deformation. All passenger assist components, including brackets, clamps, screw heads and other

fasteners used on the passenger assists, shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

TS 77.2 Front Doorway

Front doors, or the entry area, shall be fitted with ADA-compliant assists. Assists shall be as far outward as practicable, but shall be located no farther inboard than 6 in. from the outside edge of the entrance step and shall be easily grasped by a 5th-percentile female boarding from street level. Door assists shall be functionally continuous with the horizontal front passenger assist, the vertical assist and the assists on the wheel housing or on the front modesty panel.

TS 77.3 Vestibule (Transit Coach)

The aisle side of the driver's barrier, the wheel housings, and when applicable the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend to within 36 in. of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm.

A horizontal passenger assist shall be located across the front of the bus and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the fare collection procedure. The assist shall be no less than 36 in. above the floor. The assists at the front of the bus shall be arranged to permit a 5th-percentile female passenger to easily reach from the door assist, to the front assist, to vertical assists on the driver's barrier, wheel housings or front modesty panel.

TS 77.4 Rear Doorway(s) (Transit Coach)

Vertical assists that are functionally continuous with the overhead assist shall be provided at the aisle side of the transverse seat immediately forward of the rear door and on the aisle side of the rear door modesty panel(s). Passenger assists shall be provided on modesty panels that are functionally continuous with the rear door assists. Rear doors, or the exit area, shall be fitted with assists having a cross-sectional diameter between 1¼ and 1½ in. or providing an equivalent gripping surface with no corner radii less than ¼ in., and shall provide at least 1½ in. of knuckle clearance between the assists and their mounting. The assists shall be designed to permit a 5th-percentile female to easily move from one assist to another during the entire exiting process. The assists shall be located no farther inboard than 6 in. from the outside edge of the rear doorway step.

TS 77.5 Overhead (Transit Coach)

Except forward of the standee line and at the rear door, a continuous, full-grip, overhead assist shall be provided. This assist shall be located over the center of the aisle seating position of the transverse seats. The assist shall be no less than 70 in. above the floor.

ALTERNATIVE

Grab straps or other extensions as necessary shall be provided for sections where vertical assists are not available and for use by passengers who cannot reach to 70 in.

ALTERNATIVE

Grab straps shall be fabric.

Overhead assists shall simultaneously support 150 lb on any 12 in. length. No more than 5 percent of the full grip feature shall be lost due to assist supports.

TS 77.6 Longitudinal Seat Assists (Transit Coach)

Longitudinal seats shall have vertical assists located between every other designated seating position, except for seats that fold/flip up to accommodate wheelchair securement. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. Assists shall be staggered across the aisle from each other where practicable and shall be no more than 52 in. apart or functionally continuous for a 5th percentile female passenger.

TS 77.7 Wheel Housing Barriers/Assists (Transit Coach)

Unless passenger seating is provided on top of wheel housings, passenger assists shall be mounted around the exposed sides of the wheel housings (and propulsion compartments if applicable), which shall also be designed to prevent passengers from sitting on wheel housings. Such passenger assists shall also effectively retain items, such as bags and luggage, placed on top of wheel housings.

TS 78. Passenger Doors

TS 78.1 Transit Coach

Doorways will be provided in locations and styles as follows. Passenger doors and doorways shall comply with ADA requirements.

TS 78.1.1 Front door

Door shall be forward of the front wheels and under direct observation of the driver.

TS 78.1.2 Rear Door(s)

Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.

ALTERNATIVE (ARTICULATED BUS)

Curbside located forward of the rear axle of the trailer section.

ALTERNATIVE (ARTICULATED BUS)

Curbside, located forward of the center axle.

In cases where street-side and curbside doors are chosen, provisions shall be made for operating the front door, curbside rear door(s) and street-side rear door(s) independently or in the combinations shown in **Table 7** while providing positive tactile feedback to the operator identifying the door control selection.

TABLE 7
Door Operating Combinations

Front	Curbside Rear	Street-Side Rear
Closed	Closed	Closed
Open	Closed	Closed
Open	Open	Closed
Open	Closed	Open
Open	Open	Open
Closed	Open	Closed
Closed	Closed	Open
Closed	Open	Open

DEFAULT
If air-powered, the door system shall operate per specification at air pressures between 90 and 130 psi.

ALTERNATIVE
Electric-powered doors.

TS 78.2 Commuter Coach

TS 78.2.1 Front door

Forward of the front wheels and under direct observation of the driver.

TS 78.3 Materials and Construction

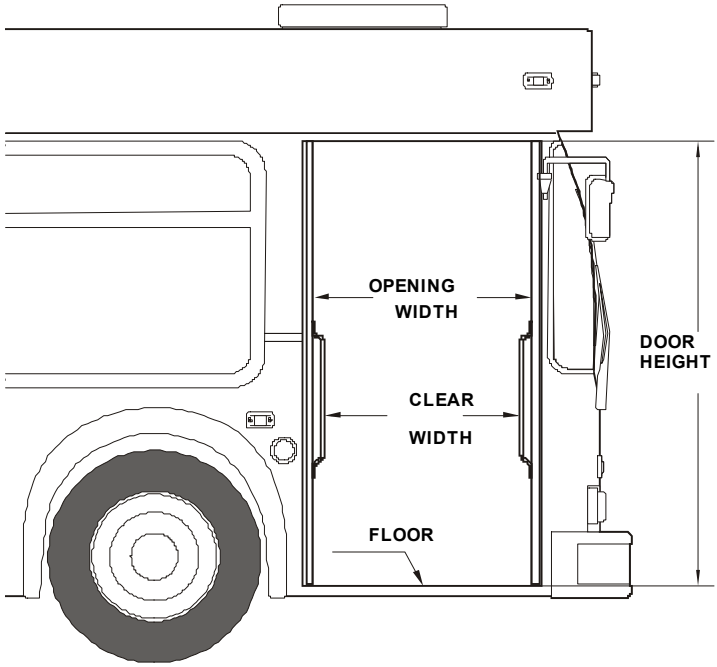
Structure of the doors, their attachments, inside and outside trim panels and any mechanism exposed to the elements shall be corrosion resistant. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. When fully opened, the doors shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. Door edges shall be sealed to prevent infiltration of exterior moisture, noise, dirt and air elements from entering the passenger compartment, to the maximum extent possible based on door types.

The closing edge of each door panel shall have no less than 2 in. of soft weather stripping. The doors, when closed, shall be effectively sealed, and the hard surfaces of the doors shall be at least 4 in. apart (not applicable to single doors). The combined weather seal and window glazing elements of the front door shall not exceed 10 deg of binocular obstruction of the driver's view through the closed door.

TS 78.4 Dimensions

TS 78.4.1 Transit Coach

FIGURE 7
Transit Bus Minimum Door Opening



When open, the doors shall leave an opening no less than 75 in. in height.

31¾ in. Minimum Doorway Clear Width

Front door clear width shall be a minimum of 31¾ in. with the doors fully opened. Rear door opening clear width shall be a minimum of 24 in. with the doors fully opened. If arear door ramp or lift is provided, then the clear door opening width shall be a minimum of 31¾ in. with door fully opened.

TS 78.4.2 Commuter Coach

Minimum doorway width per ADA requirements.

TS 78.5 Door Glazing

The upper section of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section.

Door glazing shall be easily replaceable.

The front door panel glazing material shall have a nominal ¼ in. thick tempered glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the recommended practices defined in SAE J673.

Glazing material in the rear doorway door panels shall be defined by the Agency.

TS 78.6 Door Projection (Transit Coach)

TS 78.6.1 Exterior

The exterior projection of the front doors beyond the side of the bus shall be minimized and shall not block the line of sight of the rear exit door via the curbside mirror when the doors are fully open. The exterior projection of both doors shall be minimized and shall not exceed 14 in. during the opening or closing cycles or when doors are fully opened.

TS 78.6.2 Interior

Projection inside the bus shall not cause an obstruction of the rear door mirror or cause a hazard for standees.

TS 78.7 Door Height Above Pavement

It shall be possible to open and close either passenger door when the bus loaded to gross vehicle weight rating is not knelt and parked with the tires touching an 8 in. high curb on a street sloping toward the curb so that the street-side wheels are 5 in. higher than the right-side wheels.

TS 78.8 Closing Force

Closing door edge speed shall not exceed 12 in. per second, and opening door speed shall not exceed 19 in. per second. Power doors shall not slam closed under any circumstance, even if the door is obstructed during the closing cycle. If a door is obstructed during the closing cycle, the pressure exerted on the obstruction shall not increase once initial contact has been made.

Doors closed by a return spring or counterweight-type device shall be equipped with an obstruction-sensing device that, at a minimum, alerts the driver if an obstruction is detected between the closing doors. Doors closed by a return spring or counterweight type device, when unlocked, shall be capable of being pushed to the point where the door starts to open with a force not to exceed 25 lb applied to the center edge of the forward door panel.

Whether or not the obstruction-sensing system is present or functional, it shall be possible to withdraw a 1½ in. diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 lb.

TS 78.8.1 Rear Door Closing Force (Transit Coach)

Power-close rear doors shall be equipped with an obstruction-sensing system such that if an obstruction is within the path of the closing doors, the doors will stop and/or reverse direction prior to imparting a 10 lb force on 1 sq in. of that obstruction. If a contactless obstruction sensing system is employed, then it shall be capable of discriminating between the normal doorway environment and passengers or other obstructions within the doorway, and of altering the zones of detection based upon the operating state of the door system.

TS 78.9 Actuators

Doors shall open or close completely in not more than 3.5 seconds from the time of control actuation and shall be subject to the closing force requirements.

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be rebuildable. If powered by compressed air, exhaust from the door system shall be routed below the floor of the bus to prevent accumulation of any oil that may be present in the air system and to muffle sound.

Door actuators and associated linkages shall maximize door holding forces in the fully open and fully closed positions to provide firm, non-rattling, non-fluttering door panels while minimizing the force exerted by the doors on an obstruction midway between the fully open and closed positions.

The rear door actuator(s) shall be under the complete control of the vehicle operator and shall open and close in response to the position of the driver's door control.

The rear doors shall be passenger-controlled. The vehicle operator shall unlock and enable the opening mechanism, which shall be annunciated by illumination of a green light near the door. After enabling and unlocking, the doors shall be opened by either the passenger manually pushing the door open, or by a powered mechanism actuated by passenger activation of a touch bar or touch switch, or by passenger activation of a contactless sensing system. A switch located within reach of the seated operator shall, when actuated, restore rear door function to complete operator control, as described in the Default.

Doors that employ a "swing" or pantograph geometry and/or are closed by a return spring or counterweight-type device shall be equipped with a positive mechanical holding device that automatically engages and prevents the actuation mechanism from being back-driven from the fully closed position. The holding device shall be overcome only when the driver's door control is moved to an "Exit Door Enable" position and the vehicle is moving at a speed of less than 2 mph, or in the event of actuation of the emergency door release.

Locked doors shall require a force of more than 300 lb to open manually. When the locked doors are manually forced to open, damage shall be limited to the bending of minor door linkage with no resulting damage to the doors, actuators or complex mechanism.

TS 78.9.1 Actuator (Commuter Coach)

The nominal door opening and closing speed shall be in the 3 to 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.

TS 78.9.2 Rear Door Interlocks (Transit Coach)

See TS 41.1, "Hardware Mounting," for door system interlock requirements.

TS 78.10 Emergency Operation

In the event of an emergency, it shall be possible to manually open doors designated as emergency exits from inside the bus using a force of no more than 25 lb after actuating an unlocking device. The unlocking device shall be clearly marked as an emergency-only device and shall require two distinct actions to actuate. The respective door emergency unlocking device shall be accessible from the doorway area. The unlocking device shall be easily reset by the operator without special tools or opening the door mechanism enclosure. Doors that are required to be classified as "emergency exits" shall meet the requirements of FMVSS 217.

TS 78.11 Door Control

The door control shall be located in the operator's area within the hand reach envelope described in SAE J287, "Driver Hand Control Reach." The driver's door control shall provide tactile feedback to indicate commanded door position and resist inadvertent door actuation.

DEFAULT

Door control located on street side.

The front door shall remain in commanded state position even if power is removed or lost.

TS 78.12 Door Controller

TS 78.12.1 Transit Coach

Five-Position Driver's Door Controller

The control device shall be protected from moisture. Mounting and location of the door control device handle shall be designed so that it is within comfortable, easy arm's reach of the seated driver. The door control device handle shall be free from interference by other equipment and have adequate clearance so as not to create a pinching hazard.

Position of the door control handle shall result in the following operation of the front and rear doors:

- **Center position:** Front door closed, rear door(s) closed or set to lock.
- **First position forward:** Front door open, rear door(s) closed or set to lock.
- **Second position forward:** Front door open, rear door(s) open or set to open.
- **First position back:** Front door closed, rear door(s) open or set to open.
- **Second position back:** Front door open, rear door(s) open or set to open.

TS 78.12.2 Commuter Coach

Doors shall be operated by push-button controls, conveniently located and operable within the driver's reach. The push buttons shall be labeled.

TS 78.13 Door Open/Close

Operator-Controlled Front and Passenger-Controlled Rear Doors with Provision for Driver Override

Operation of, and power to, the front passenger doors shall be completely controlled by the operator. Power to rear doors shall be controlled by the operator. After enabling, the rear doors shall be opened by the passenger. A switch shall be provided to enable the driver to obtain full control of the rear doors.

A control or valve in the operator's compartment shall shut off the power to, and/or dump the power from, the front door mechanism to permit manual operation of the front door with the bus shut down. A master door switch, which is not within reach of the seated operator, when set in the "off" position shall close the rear/center doors (if applicable), deactivate the door control system, release the interlocks and permit only manual operation of the rear/center doors.

TS 79. Accessibility Provisions

Space and body structural provisions shall be provided at the front or rear door of the bus to accommodate a wheelchair loading system.

TS 79.1 Loading Systems

There are three options:

- high-floor lift
- low-floor ramp
- platform (boarding bridge plate) level boarding

TS 79.2 Lift/ramp

The wheelchair lift control system must be capable of receiving multiplex commands from vehicle interlocks.

An automatically controlled, power-operated wheelchair lift system compliant to requirements defined in 49 CFR 571.403 (FMVSS 403) shall provide ingress and egress quickly, safely and comfortably, both in forward and rearward directions, for a passenger in a wheelchair from a level street or curb.

DEFAULT

Wheelchair lift mounted in front step well.

Folding Ramp

When the system is not in use, the passageway shall appear normal. In the stored position of the ramp, no tripping hazards shall be present, and any resulting gaps shall be minimized. The controls shall be simple to operate with no complex phasing operations required, and the loading system operation shall be under the surveillance and complete control of the driver. If the loading system and controls are at the rear doors, then a keyed switch shall be provided in the driver's area to disable the loading system. The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The loading system shall be inhibited from stowing/deploying when a passenger is on the ramp/platform. A passenger departing or boarding via the ramp shall be able to easily obtain support by grasping the passenger assist located on the doors or other assists provided for this purpose. The platform shall be designed to protect the ramp from damage and people on the sidewalk from injury during the extension/retraction or lowering/raising phases of operation.

The loading platform shall be covered with a replaceable or renewable nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading.

Deployment or storage of the ramp shall require no more than 15 seconds. The device shall function without failure or adjustment for 500 cycles or 5000 miles in all weather conditions on the design operating profile when activated once during the idle phase. A manual override system shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 35 lb of force.

TS 79.3 Loading System for 30 to 60 ft Low-Floor Bus

An automatically controlled, power-operated ramp system compliant to requirements defined in 49 CFR Part 38, Subpart B, §38.23c shall provide ingress and egress quickly, safely and comfortably, both in forward and rearward directions, for a passenger in a wheelchair from a level street or curb.

DEFAULT

Front Door Location of Loading System, Flip-Out Design Ramp with 6:1 Slope

The wheelchair loading system shall be located at the front door, with the ramp being of a simple hinged, flip-out type design being capable of deploying to the ground at a maximum 6:1 slope.

TS 79.4 Loading System for Level Boarding on a 45 to 60 ft Low-Floor BRT

For level-entry boarding in applications such as BRT, where the vertical transition from the vehicle floor and the boarding and alighting surface is no more than 3 in., a bridge plate shall be used. Bridge plates 30 in. or longer shall support a load of 600 lb, placed at the centroid of the ramp or bridge plate distributed over an area

of 26 × 26 in., with a safety factor of at least 3, based on the ultimate strength of the material. Bridge plates shorter than 30 in. shall support a load of 300 lb. When deployed to boarding and alighting surface, the slope of the bridge plate shall not exceed 6:1.

DEFAULT

Front Door Location of Bridge Plate Loading System

The bridge plate loading system shall be located at the front door.

ALTERNATIVE

Rear Door Location of Bridge Plate Loading System

The bridge plate loading system shall be located at the rear/center door.

TS 79.5 Wheelchair Accommodations

All passenger securement devices must be stowed off the floor and out of the way when not in use.

DEFAULT

Two Forward-Facing Wheelchair Securement Locations

Two forward-facing locations, as close to the wheelchair loading system as practical, shall provide parking space and securement system compliant with ADA requirements for a passenger in a wheelchair.

TS 79.6 Interior Circulation

Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device and from the designated securement area. It shall be designed so that no portion of the wheelchair protrudes into the aisle of the bus when parked in the designated parking space(s). When the positions are fully utilized, an aisle space of no less than 20 in. shall be maintained. As a guide, no width dimension should be less than 34 in. Areas requiring 90 deg turns of wheelchairs should have a clearance arc dimension no less than 45 in., and in the parking area where 180 deg turns are expected, space should be clear in a full 60 in. diameter circle. A vertical clearance of 12 in. above the floor surface should be provided on the outside of turning areas for wheelchair footrests.

TS 80. Wheelchair Lifts (Commuter Coach)

TS 80.1 Lift

A travel lift and two forward-facing mobility device securement areas 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.

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.

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 to 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/propulsion system 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.

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 handheld pendant.

The lift shall include a hinged platform to bridge the coach floor to the lift platform. The bridge shall be hinged and locked in an upward position to act as a barrier when the lift is in use. The bridge shall also allow lift passenger 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 ensure that they are folded in the proper order.

The lift shall include an emergency system in case of driver operation malfunction. Should an emergency situation occur, the lift operator shall release the push-button switch on the controller to immediately stop 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 luggage bay door. The handle shall be stored adjacent to the pump to allow immediate usage.

TS 80.2 Lift Door

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 vehicle 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 vehicle 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.

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.

The lift storage door shall not block the visual observation to the lift assembly while using 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 luggage door is a preferred design.

TS 80.3 Lift Width

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.

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.

A threshold warning module with a red warning light and an acoustic sensor shall be mounted in the ceiling structure above the wheelchair lift entrance doorway.

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

A passenger chime tape switch shall be mounted on the sidewall at the two wheelchair securement positions.

Each coach shall have adequate information decals installed that detail the proper lift operation in both the normal and manual modes of operation.

TS 80.4 Lighting Requirements

Lighting for the lift areas shall be designed to meet Title 13 and 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 6 candlepower a distance of 3 ft beyond the external dimensions of the lift platform once deployed and lowered. Additional lighting shall be provided to ensure illumination of the instruction placard and the manual override pump when it is in use.

TS 80.5 Securement System

The vehicle interior shall permit the securement of two forward-facing wheelchair passengers in which the primary position shall be on the street side of the coach directly across from the lift. Securement areas shall be a minimum 30 × 48 in. as required by the ADA.

A separate three-point belt securement shall be provided to effectively secure wheelchair passengers. 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. A minimum 10.5 in. high barrier shall also be provided at the rear of the lift area for additional passenger protection.

TS 80.6 Roof Ventilation/Escape Hatches

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.

ALTERNATIVE

A rear egress window can replace a rooftop escape hatch.

ALTERNATIVE

A single roof-top escape hatch.

SIGNAGE AND COMMUNICATION

TS 81. Destination Signs

A destination sign system shall be furnished on the front, on the right side near the front door.

Route sign on the rear of the vehicle.

All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver.

The driver shall be able to access the sign while seated.

The destination sign compartments shall meet the following minimum requirements:

- Compartments shall be designed to prevent condensation and entry of moisture and dirt.
- Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself.
- Access shall be provided to allow cleaning of inside compartment window and unit glazing.
- The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide.

Run number sign shall be installed.

TS 82. Passenger Information and Advertising (Transit Coach)

TS 82.1 Interior Displays

Provisions shall be made on the rear of the driver's barrier or equipment box located on the wheel well for a frame to retain information such as routes and schedules.

Advertising media 11 in. high and 0.09 in. thick shall be retained near the juncture of the bus ceiling and sidewall. The retainers may be concave and shall support the media without adhesives. The media shall be illuminated by the interior light system.

TS 83. Passenger Stop Request/Exit Signal

TS 83.1 Transit Coach

Pull Cord Passenger Signal

A passenger "stop requested" signal system that complies with applicable ADA requirements defined in 49 CFR, Part 38.37, shall be provided. The system shall consist of a heavy-duty pull cable, chime and interior sign message. The pull cable shall be located the full length of the bus on the sidewalls at the level where the transom is located. If no transom window is required, then the height of the pull cable shall approximate this transom level and shall be no greater than 63 in. as measured from the floor surface. It shall be easily accessible to all passengers, seated or standing. Pull cable(s) shall activate one or more solid state or magnetic proximity switches. At each wheelchair passenger position and at priority seating positions, additional provisions shall be included to allow a passenger in a mobility aid to easily activate the "stop requested" signal.

An auxiliary passenger "stop requested" signal shall be installed at the rear door to provide passengers standing in the rear door/exit area a convenient means of activating the signal system. The signal shall be a heavy-duty push button type located in the rear door vicinity. Button shall be clearly identified as "passenger signal."

TS 83.2 Commuter Coach

A heavy-duty “stop request” signal button shall be installed at every seat location except the rear cross seat.

TS 83.3 Signal Chime

A single “stop requested” chime shall sound when the system is first activated. A double chime shall sound anytime the system is activated from wheelchair passenger areas.

Exit signals located in the wheelchair passenger area shall be no higher than 4 ft above the floor. Instructions shall be provided to clearly indicate function and operation of these signals.

DEFAULT (COMMUTER COACH)

A single “stop requested” chime shall sound when the system is first activated. A double chime shall sound anytime the system is activated from wheelchair passenger areas.

Exit signals located in the wheelchair passenger area shall be no higher than 4 ft above the floor. Instructions shall be provided to clearly indicate the function and operation of these signals.

TS 84. Communications

TS 84.1 Camera Surveillance System

Provide all wiring and mounting locations for a multi-camera surveillance system, including the installation of cameras, recorder, microphone, etc.

ALTERNATIVE

TS 84.2 A camera system shall be installed. Agency to provide details of camera system, including installation locations and number of buses to be equipped.Public Address System

A public address system shall be provided on each bus for facilitating radio system and driver-originated announcements to passengers.

TS 84.2.1 Speakers

DEFAULT

Interior loudspeakers shall be provided, semi-flush mounted, on alternate sides of the bus passenger compartment, installed with proper phasing. Total impedance seen at the input connecting end shall be 8 ohms. Mounting shall be accomplished with riv-nuts and machine screws.

TS 84.3 Automatic Passenger Counter (APC)

ALTERNATIVE

An infrared APC system shall be installed. Agency to provide details of APC system, including installation locations and number of buses to be equipped.

TS 84.4 Radio Handset and Control System

A separate electrical circuit protected with the circuit breaker shall be provided to the radio transceiver location. The radio circuit shall be connected and placed to minimize electrical noise and transients. The power supply should be proposed with available variations to accommodate various systems in use by PSTA.

TS 84.4.1 Driver's Speaker

Each bus shall have a recessed speaker in the ceiling panel above the driver. This speaker shall be the same component used for the speakers in the passenger compartment. It shall have 8 ohms of impedance.

TS 84.4.2 Handset

Contractor will install a handset for driver use.

TS 84.4.3 Emergency Alarm

Contractor shall install an emergency alarm that is accessible to the driver but hidden from view.

TS 85. Electronics/Equipment Compartment

Each bus shall be equipped a fully sealed compartment located on the left front wheelhouse to provide a mounting location for radio equipment, video recording equipment, APC equipment and other electronic equipment. The compartment shall be lockable, completely water resistant and of steel construction. It shall be accessible from inside the bus, shall have 3 slide trays that automatically lock into place for easy maintenance of the equipment. The compartment shall be water resistant when the service door is secured. The compartment shall be supplied with power and ground circuit requirements.

A location convenient to the driver shall be provided for the radio control head, speaker and handset. The antenna mounting and lead termination shall be accessible from the bus interior. Conduit shall lead to the radio compartment and shall have a minimum bend radius adequate for easy pulling of coaxial cable. An access plate shall be provided in the ceiling. The compartment door shall have a lock. A sealing provision (gasket) shall be incorporated in the door of this compartment. The radio compartment finish shall be powder coated Black, standard black, or PSTA designated color.

Radio Mounting

A suitable area shall be provided for the mounting of communication Radio. This mounting could range from a simple plate to a box to contain the radio. A factor governing the mounting of the radio is what space is available. Another provision is that the cable that connects the radio and control head switch must be routed to an area immediately accessible to the driver.

Antenna

A single antenna will be mounted on the roof of each bus that will accommodate RF/GPS/Cellular. This antenna shall be located as close to midpoint between the two sides as practical, but not on a seam, and as close to the area of the radio, as to preclude a long run of coaxial cable that connects the radio and the antenna, so as to provide access below, should the antenna ever need to be changed. A 1" inside diameter flexible conduit with pull cord shall be incorporated into the roof and sidewall of the bus from the immediate area of the antenna so that the coaxial cable can be easily repaired as needed.

Antenna and Access Panel

An antenna access panel shall be installed in the ceiling of each bus at a point from the centerline of the bus, four (4) feet from the front of the bus. The access panel shall be located as close to a structural member as practical in order to provide a mounting base for the radio antenna.

An option to supply and mount a low profile 800 MHz antenna (Antenna Specialist ASP-930T) with RG58 coax cable and TNC connector to the radio will be provided and priced separately.

An option to supply and mount a GPS antenna w/gasket (Trimble 502 Model 18334) with RG58 coax cable and F Type male connector to the VLU will be provided and priced separately. The Contractor shall mount the GPS antenna (P/N 801-3200-000) and cable supplied with the Stop Announcement System.

All antenna cables shall be run in 1 inch diameter conduit to the radio box. Removable access covers shall be provided in the ceiling of the bus in order to allow access to the antenna and conduit. Three antennas shall be installed on every bus. Antenna locations shall be as close as possible to the center line of the bus and have a separation of approximately 3 feet. All mounting locations shall be approved by the appropriate municipality prior to bus manufacture.

TS 86. Computer Assisted Dispatching System (CAD/AVL)

There will be a requirement to furnish and install a complete automatic vehicle locating (AVL), computer assisted dispatching system as part of this proposal. The equipment provided and installed shall be manufactured and provided by Clever Devices.

Each PSTA bus is equipped with various components provided by Clever Devices to include all necessary wiring and software installation. The on board computing processer unit- IVN4 is the central processing unit for each revenue service vehicle in the PSTA fleet. Along with the IVN4 each bus has an interactive Mobile Data Terminal (MDT) which Clever Devices references as a Transit Control Head (TCH). This equipment is interfaced with the bus radio, destination signs, and fare boxes to provide a central "Single Point Logon." All data is transmitted through a cellular network.

Clever Devices also provides to PSTA an Automatic Vehicle Monitoring System (AVM-3) for each individual bus controlled by a central networking system. This interface monitors the major vehicle components and generates automatic reports through our Wireless Access Points (file dumping) and real-time monitoring via a cellular network.

TS 87. Charging System Specifications

The Contractor shall supply battery chargers to recharge the propulsion batteries of the electric buses provided under the terms of this Contract.

For the intent of this proposal, the chargers being requested shall be the following type:

- "In-Shop" and/or "Depot" Charger—a charger to be installed at the Agency's Maintenance Facility.
- "In-Field" and/or "On-Route Charger—a charger to be installed on the routes where the Agency intends to use the electric buses in normal revenue service.

These general requirements apply to all charging stations that may be delivered under the Contract. The Contractor shall provide charging equipment and the control and data system needed to recharge the bus propulsion system batteries.

The Contractor shall provide all charging equipment design requirements and specifications to the Agencyand it's designated architectural, civil, electrical, and mechanical engineering contractors to enable charging station site design, permitting, and construction.

The Contractor shall provide close coordination with the Agency and its engineering contractors during site design and construction of the charging stations. The Contractor shall be responsible for equipment start-up and testing to ensure that the charging equipment meets all stated specifications and functionality prior to site acceptance.

The chargers shall be rated for the intended purpose and location environment. The charging systems shall be capable of delivering the optimal battery charge profile as specified by the battery manufacturer and charging the installed traction battery to a fully charged state from the minimum recommended state-of-charge including necessary cool-down time as specified by the battery manufacturer. The chargers shall be capable of connection to a 480-volt, 3-phase, 60- Hz electrical supply.

The chargers shall be equipped with an submeter that:

Measures and displays kWh consumed and real time load in KW within 1% accuracy;

Is capable of RS-485 communications; and

Records kWh and kVARh delivered, kWh and kVARh received.

Battery chargers shall be configured to automatically apply a charging protocol appropriate to the battery's state-of-charge (SOC), in accordance with the battery manufacturer's recommended practices. The battery charger shall be configured to automatically initiate and sustain charging at any battery state-of-charge if properly connected when so signaled by an external timing circuit or control input. The battery charger shall be configured to automatically terminate the charge on attainment of a full state-of-charge or in the event of hazardous or anomalous conditions. Battery chargers shall be able to apply commissioning, equalization or conditioning charges according to the battery manufacturer's recommended practices when so configured by operation of keyboard or switch panel inputs. The battery charger shall be configured to automatically restart after unintended interruption of a charging episode due to interruption or temporary degradation of electrical service. The battery chargers shall be configured to interface with on-board battery management and interlock systems.

The actual charge profiles that the subject chargers deliver while charging, commissioning, equalizing, and conditioning the battery systems of the subject buses shall be recorded by the Contractor and shall be submitted to the battery manufacturer for review and approval. Written confirmation from the battery manufacturer attesting to the appropriateness of the delivered charge profile shall be submitted to PSTA concurrent with or prior to delivery of the first bus.

The buses must be immobilized during all charging operations. Upon successful engagement of the charging interface, the bus shall be interlocked such that propulsion is rendered non-tractive and the brakes applied.

Any charging system installed under this contract shall be metered separately to enable PSTA to generate energy consumption reports and costs.

TS 87.1 "In-Shop" and/or "Depot Charger"

The chargers shall be capable of charging a minimum of two (2) buses simultaneously.

Installed chargers shall meet all applicable codes and manufacturer recommendations. Documentation showing that the chargers meet such applicable codes shall be included with each Proposal.

The bus shall be equipped with a single charge socket connection, accessible on the outside of the vehicle under a maintenance door, allowing a supplied charging cable to be attached to the bus.

Inside the vehicle, power shall be distributed through a main distribution panel with individual circuit breakers and RCD/GFCI protection on the input to the charging module or modules. Each charger circuit shall also be protected on the output stage to the battery pack or packs.

The installed chargers shall be designed and installed in such way that a single PSTA maintenance employee can safely connect (and disconnect) the charger(s) to the bus(es) without the need for a ladder or any special tools.

Installed chargers shall be specifically designed for charging the propulsion batteries installed on the buses provided un-der this contract.

Chargers or vehicles shall have indicating lights or a display that very clearly display the state of operation the charger is in (e.g., charging, not charging, etc.) and also display the percentage of charge the batteries are in (e.g., 65% charged).

Chargers shall have an emergency shut off switch that is clearly marked, easily accessible and easily operable.

The chargers shall be UL listed.

The chargers shall be equipped with suitably rated (electrically) cables to properly charge a nearby parked bus. Cables and connectors shall be resistant to oil, diesel fuel and other corrosives found in the Agency's Maintenance Facility.

The connectors shall be industry standard and of simple design and heavy-duty construction and shall not be energized except when mated with the bus mounted receptacle. A single bus mounted receptacle shall serve both the depot charging station and the opportunity charging station. The bus mounted receptacle shall be of simple and ergonomic design, of not more than 25 pounds (plug and cord), not more than two plugs, and heavy-duty construction, and shall not be energized except when mated with the charger connectors.

The connector to the bus shall have a locking mechanism, ensuring the connector will not come loose or fall by incidental contact.

There shall be a means of storing the cable, neatly, while the charger is not in use.

The chargers shall be mounted in such a way that three (3) inches of standing water will not adversely affect the operation of the charger.

Contractor shall submit power requirements with proposal documents.

All modifications to the facility shall be in accordance of applicable codes, ordinances and manufacturer's recommendations and shall meet the Agency's approval.

Contractor shall provide detailed wiring diagrams for the charger including controls.

Immediately upon charging circuit activation and until the recharging period is complete, the connected bus shall be automatically rendered inoperable. The bus shall remain inoperable until disconnected from the charger. Recharging of the bus must be dependent on the bus being completely stationary with the parking brake of the bus engaged. The charger shall be a completely self-contained package, designed for 24-hour operation and suitable for outdoor use. Connection of the charger to any electric bus provided under the terms of this contract shall be made without climbing on the roof of the bus.

The charger shall be capable of operating continuously without performance or safety degradation in environmental conditions common to the State of Florida.

Common environmental conditions include an ambient temperature range of 50ºF to 115ºF, at relative humidity between 60-percent and 100-percent. Chargers shall be mounted in such a way so as to prevent water, from floor washers or bus run off, entering the base of the units. If chargers are vehicle mounted, they shall be installed in such a way to prevent debris, water, salt, etc. from entering the unit.

Chargers shall not produce harmonic distortion in excess of 5% THD. Charging circuits shall be isolated from the vehicle chassis such that ground current from the grounded chassis does not exceed 5 mA.

The bid package shall contain a complete description of the charging systems (including anticipated AC energy consumption for buses operating on the specified operating profile, power factors, harmonic distortion, and accuracy of charge parameters).

TS 87.2 "In-Field" and/or "On-Route" Charger

The charger shall charge one (1) bus at a time but, however, have the capacity to charge several buses throughout the course of a day if multiple electric buses are used on a designated fixed route service.

Installed chargers shall meet all applicable codes and manufacturer recommendations. Documentation showing that the chargers meet such applicable codes shall be included with each Proposal.

The charging stations shall be equipped with a communication system to transmit information on each charge event, including, but not limited to bus ID, charger status, faults, beginning SOC, charge amount, ending

SOC, charge duration, energy consumption at the mains supply, energy consumption at the charge interface, max power, ambient temperature, etc.

The charging interface may be conductive or inductive. The bus may be equipped with a mechanism which connects to an external charging mechanism i.e. overhead charge interface, charge head, pantograph, or an interface which is under the vehicle, etc.

The charging sequence shall include the entire docking of the vehicle, instructions to the bus operator, disengagement of the vehicle prior to charging of the vehicle, charging of the vehicle, and release of the vehicle from the charger.

Immediately upon charging circuit activation and until the recharging period is complete, the connected bus shall be automatically rendered inoperable. The bus shall remain inoperable until disconnected from the charger. Recharging of the bus must be dependent on the bus being completely stationary with the parking brake of the bus engaged.

The charger shall automatically stop if faults or errors are detected. Emergency situations detected by either the equipment or the bus operator shall automatically terminate charging and release the bus from the equipment.

The charger shall automatically stop if the batteries reach fully rated state of charge or command by the bus operator such when layover time or stop over time has expired.

In all of the mention cases above when charging is terminated all mechanisms from either the charger or the bus mounted equipment shall disconnect and be completely free from themselves so that the vehicle may safety depart.

Inside the vehicle, power shall be distributed through a main distribution panel with individual circuit breakers and RCD/GFCI protection on the input to the charging module or modules. Each charger circuit shall also be protected on the output stage to the battery pack or packs.

Installed chargers shall be specifically designed for charging the propulsion batteries installed on the buses provide under this contract.

Chargers or vehicles shall have indicating lights or a display that very clearly display the state of operation the charger is in (e.g., charging, not charging, etc.) and also display the percentage of charge the batteries are in (e.g., 65% charged).

Chargers shall have an emergency shut off switch that is clearly marked, easily accessible and easily operable.

The chargers shall be UL listed.

All installation of chargers shall be in accordance of applicable codes, ordinances and manufacturer's recommendations and shall meet the Agency's approval.

Contractor shall provide detailed wiring diagrams for the charger including controls.

The charger shall be a completely self-contained package, designed for 24-hour operation and suitable for outdoor use. Connection of the charger to any electric bus provided under the terms of this contract shall be made without climbing on the roof of the bus.

The charger shall be capable of operating continuously without performance or safety degradation in environmental conditions common to the State of Florida.

Common environmental conditions include an ambient temperature range of 50ºF to 115ºF, at relative humidity between 60-percent and 100-percent.

TS 88. Bus Maintenance Procedures

TS 88.1 Preventative and Scheduled Maintenance

The Contractor shall work with the Agency to collaboratively ensure that a maintenance program is created that includes all sub-component manufacturer requirements to include both preventative and predictive maintenance tasks. This task is specifically called out as the Agencyunderstands with new technology there is a need to constantly monitor and change the maintenance program based on its performance. These tasks shall be identified to help reduce operation costs and extending the useful life of the vehicles, while improving safety for employees and the riding public.

Maintenance tasks shall include scheduled instructions that:

- aim at the failure process of individual sub-components,
- are specific on time and detailed,
- and should include specifications or tolerances

TS 88.2 Maintenance and Inspection

Scheduled maintenance tasks shall be related and shall be, in accordance with the Contractor's recommended preventative maintenance schedule (along with routine daily service performed during the servicing and overnight charging operations). The overall PMI (Preventative Maintenance Inspection) schedule for rolling stock shall be based upon a 6,000 mile interval and/or multiples of same.

The Contractor is responsible for providing a written comprehensive 52-week and long term rehab/replacement maintenance plan encompassing buses and charging infrastructure for its entire useful life.

Test ports, as required, shall be provided for commonly checked functions on the bus, such as, hydraulic, pneumatic, cooling, temperature, voltage, current and state of charge (SOC).

The Proposer shall give prime consideration to the routine problems of maintaining the vehicle and charging and associated equipment. All vehicle and charging station components and systems, both mechanical and electrical, which will require periodic physical work or inspection processes, shall be installed so that a minimum of time is consumed in gaining access to the critical repair areas. It shall not be necessary to disassemble portions of the bus structure and/or equipment such as seats and flooring under seats in order to gain access to these areas. Each bus with charging and associated equipment shall be designed to facilitate the disassembly, reassembly, servicing or maintenance, using tools and equipment that are normally available as standard commercial items.

Requirements for the use of unique specialized tools will be minimized. The body and structure of the bus and charging equipment shall be designed for ease of maintenance and repair. Individual panels or other equipment which may be damaged in normal service shall be repairable or replaceable. Ease of repair shall be related to the vulnerability of the item to damage in service.

The Proposer shall provide a list of all special tools and pricing for maintaining this equipment.

TS 88.3 Conditional Assessment

The Contractor shall be responsible for conducting a conditional assessment of the buses at the end of one year and three years of service life. A condition assessment is the process of inspecting, analyzing or testing the assets to collect data that is used to measure condition and performance. The condition assessment process involves a general inspection of all buses delivered, review of past performance/repair records, testing or analysis that evaluate an asset's visual and physical conditions (for example, structural issues, faulty components). Additionally, the Agency looks toward the Contractor to assess our internal procedures, training, inventory etc.

This process addresses risk, ensures that the asset can meet its level-of-service requirements, and provides information from which assets can be managed across their lifecycles. The condition assessment will measure the anticipated condition of the asset, relative to its useful life. Condition assessment and performance monitoring may lead to the following activities:

- Address immediate issues by completing reactive maintenance activities.
- Proactively identify any predictive and preventive maintenance or rehabilitation necessary, including modifying existing practices.
- Collect condition and performance data for scenario evaluation and performance modeling.
- Consider any engineering changes to retrofit existing equipment or improve future models of said equipment.

TS 88.4 Cost of Ownership

The Agency is interested in the long term cost of ownership, particularly the maintenance requirements that are routine, scheduled and/or reasonably predictable. In addition to the Proposers submittals describing and defining the service and maintenance requirements for the equipment, a "Cost of Ownership" template has been developed and included in the forms to be filled out by the Proposer as an element of the submittal package. This form itemizes tasks in three areas, PMI, scheduled maintenance and major component replacement.

TS 89. Charger Maintenance Procedures

TS 89.1 Preventative and Scheduled Maintenance

The Contractor shall provide a three (3) years of maintenance technical support of the charging equipment (both on-route and depot charges). This three year period shall correspond to the warranty period in start and end date as outlined in the Warranty Section.

- A written maintenance plan and training must be provided to the Agency prior to acceptance. The plan shall include at a minimum a 52 week preventative and scheduled maintenance and Long-term capital rehab / replacement plan for the life of the system.
- PSTA will use its own staff (or through the use of outside subcontractors) to provide weekly inspections as required to check fluids, drain filters and perform other similar light inspection and service as documented in the maintenance plan.

- Contractor shall visit the site not less frequently than once per month to perform inspections and maintenance as required. These visits must be coordinated with the Agency to ensure that there are buses that can be charged to allow operational testing.
- Contractor shall maintain detailed records of all inspections, calibrations, tests, maintenance and repairs. Information shall be provided to the Agency on a timely basis for storage.

TS 89.2 Maintenance Materials and Licenses

The Contractor shall supply all parts and consumables included within the cost of the contract.

- The Contractor shall maintain an inventory of all required parts including consumables and major repair parts during the terms of this contract.
- The Agency will pay the cost of all electric power and communications to the station.
- The Agency will provide insurance on the property.
- Contractor will provide other insurance as indicated elsewhere in this document.
- Contractor shall keep all operating permits current.
- Contractor shall at their own expense provide any documentation and/or testing required and pay any fees required for these permits.
- Contractor shall pay any upgrade or annual license fees as required to keep all copies of software current.

TS 89.3 Performance Reporting

The Contractor shall be responsible for monitoring the performance of the charging equipment and re-porting the condition to the Agency on a monthly basis. The report should include any recommendations for improvements that improve the charging of the buses or reduce the overall operational costs during the duration of the contract.

TS 89.4 Conditional Assessment

The Contractor shall be responsible for conducting a conditional assessment of the charging equipment at the end of one year and three years of service life. A condition assessment is the process of inspecting, analyzing or testing the assets to collect data that is used to measure condition and performance. The condition assessment process involves a review of past performance/repair records, inspections, testing or analysis that evaluate an asset's visual and physical conditions (for example, structural issues, faulty components).

This process addresses risk, ensures that the asset can meet its level-of-service requirements, and provides information from which assets can be managed across their lifecycles. The condition assessment will measure the anticipated condition of the asset, relative to its useful life. Condition assessment and performance monitoring may lead to the following activities:

- Address immediate issues by completing reactive maintenance activities.
- Proactively identify any predictive and preventive maintenance or rehabilitation necessary, including modifying existing practices.
- Collect condition and performance data for scenario evaluation and performance modeling.
- Consider and engineering changes to retrofit existing equipment or improve future models of said equipment.

TS 89.5 Cost of Ownership

The Agency is interested in the long term cost of ownership, particularly the maintenance requirements that are routine, scheduled and/or reasonably predictable. In addition to the Proposers submittals describing and defining the service and maintenance requirements for the equipment, a "Cost of Ownership" template has been developed and included in the forms to be filled out by the Proposer as an element of the submittal package. This form itemizes tasks in three areas, PMI, scheduled maintenance and major component replacement.

TS 90. Exportable Power Supply

Please describe the capabilities of the vehicle to provide power to auxiliary systems outside of the bus when stationary. Examples of auxiliary systems are standard 120 VAC accessory loads (lights and power tools), 240 VAC accessory loads, the local electrical grid, other vehicles, and/or buildings and facilities. The description shall include operation instructions and a list of resources (e.g. tools and personnel) needed to safely and properly connect the bus and provide power to off-board auxiliary systems. Proposers shall provide specifications of the power supply including but not limited to:

- available power, current and voltage,
- number, type, and location of receptacles,
- type of connector required,
- available energy at full charge,
- shutoff features and conditions,
- traction battery SOC and estimated remaining bus range at automatic shutoff,
- environmental condition requirements,
- compliance with applicable standards and UL Classification,
- maintenance requirements,
- warranty terms for related power electronics and inverters.

Describe whether exportable power features are provided as a standard offering or as an option to the proposal submission. If all or certain features are provided as an option clearly describe costs.
Requirements defined in the Access Doors (Transit Coach) section apply to all power supply access doors. Power supply access doors shall require a nominal 5/16 in. square male tool to open or lock.
The buses must be immobilized during all exportable power supply operations. Upon successful engagement of the power interface, the bus shall be interlocked such that propulsion is rendered non-tractive and the brakes applied.

SECTION 7: WARRANTY REQUIREMENTS

WR 1. Basic Provisions

WR 1.1 Warranty Requirements

WR 1.1.1 Contractor Warranty

Warranties in this document are in addition to any statutory remedies or warranties imposed on the Contractor. Consistent with this requirement, the Contractor warrants and guarantees to the original Agency each complete bus and specific subsystems and components as follows. Performance requirements based on design criteria shall not be deemed a warranty item.

WR 1.1.2 Complete Bus

The complete bus, propulsion system, components, major subsystems and body and chassis structure are warranted to be free from Defects and Related Defects for one year or 50,000 miles, whichever comes first, beginning on the date of revenue service but not longer than 15 days after acceptance under "Inspection, Testing and Acceptance." The warranty is based on regular operation of the bus under the operating conditions prevailing in the Agency's locale.

WR 1.1.3 Body and Chassis Structure

Body, body structure, structural elements of the suspension and engine cradle are warranted to be free from Defects and Related Defects for twelve (12) years or 500,000 miles, whichever comes first.

Primary load-carrying members of the bus structure, including structural elements of the suspension, are warranted against corrosion failure and/or Fatigue Failure sufficient to cause a Class 1 or Class 2 Failure for a period of 12 years or 500,000 miles, whichever comes first.

WR 1.1.4 Propulsion System

Propulsion system components, including the engine, transmission or drive motors, and generators (for hybrid technology) and drive and non-drive axles shall be warranted to be free from Defects and Related Defects for the standard two years or 100,000 miles, whichever comes first. An Extended Warranty to a maximum of five years or 300,000 miles, whichever comes first, may be purchased at an additional cost. The propulsion system manufacturer's standard warranty, delineating items excluded from the Extended Warranty, should be submitted in accordance with the Request for Pre-Offer Change or Approved Equal or with the Form for Proposal Deviation.

WR 1.1.5 Subsystems

Other subsystems shall be warranted to be free from Defects and Related Defects for two years or 100,000 miles, whichever comes first. Other subsystems are listed below:

- **Brake system:** Foundation brake components, including advancing mechanisms, as supplied with the axles, excluding friction surfaces.
- **Destination signs:** All destination sign equipment for the front, side and rear signs, power modules and operator control.
- **Heating, ventilating:** Roof and/or rear main unit only, excluding floor heaters and front defroster.
- **AC unit and compressor:** Roof and/or rear main unit only, excluding floor heaters and front defroster.
- **Door systems:** Door operating actuators and linkages.
- **Air compressor.**
- **Air dryer.**
- **Wheelchair lift and ramp system:** Lift and/or ramp parts and mechanical only.
- **Starter.**
- **Fire suppression:** Fire suppression system including tank and extinguishing agent dispensing system.
- **Hydraulic systems:** Including radiator fan drive and power steering as applicable.
- **Cooling systems:** Radiator including core, tanks and related framework, including surge tank.
- **Passenger seating excluding upholstery.**
- **Surveillance system including cameras and video recorders.**

WR 1.1.6 Extended Warranty

PSTA requires the following additional subsystems to be warranted to be free from Defects and Related Defects for six (6) years.

- Batteries
- Traction Motor
- Inverters
- Battery Charger
- On-Route Battery Charger

WR 1.1.7 Serial Numbers

Upon delivery of each bus, the Contractor shall provide a complete electronic list of serialized units installed on each bus to facilitate warranty tracking. The list shall include, but is not limited to the following:

- Electric Drive Motor (s)
- Energy Storage Module (s)
- Propulsion System Controller / Inverter (s)
- HVAC System, major components
- Steering Axle
- Drive Axle
- Power Steering Unit
- Air Compressor
- Wheelchair Ramp
- Charger/Controller
- Charger Interface
-

The Contractor shall provide updated serial numbers resulting from warranty campaigns. The format of the list shall be approved by the Agency prior to delivery of the first production bus.

WR 1.1.8 Extension of Warranty

If, during the warranty period, repairs or modifications on any bus are made necessary by defective design, materials or workmanship but are not completed due to lack of material or inability to provide the proper repair for thirty (30) calendar days, then the applicable warranty period shall be extended by the number of days equal to the delay period.

WR 1.2 Voiding of Warranty

The warranty shall not apply to the failure of any part or component of the bus that directly results from misuse, negligence, accident or repairs not conducted in accordance with the Contractor-provided maintenance manuals and with workmanship performed by adequately trained personnel in accordance with recognized standards of the industry. The warranty also shall be void if the Agency fails to conduct normal inspections and scheduled preventive maintenance procedures as recommended in the Contractor's maintenance manuals and if that omission caused the part or component failure. The Agency shall maintain documentation, auditable by the Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.

WR 1.3 Exceptions and Additions to Warranty

The warranty shall not apply to the following items:

- scheduled maintenance items
- normal wear-out items
- items furnished by the Agency

Should the Agency require the use of a specific product and has rejected the Contractor's request for an alternate product, then the standard Supplier warranty for that product shall be the only warranty provided to the Agency. This product will not be eligible under "Fleet Defects," below.

The Contractor shall not be required to provide warranty information for any warranty that is less than or equal to the warranty periods listed.

WR 1.3.1 Pass-Through Warranty

Should the Contractor elect to not administer warranty claims on certain components and wish to transfer this responsibility to the sub-suppliers, or to others, the Contractor shall request this waiver.

Contractor shall state in writing that the Agency's warranty reimbursements will not be impacted. The Contractor also shall state in writing any exceptions and reimbursement including all costs incurred in transport of vehicles and/or components. At any time during the warranty period, the Contractor may request approval from the Agency to assign its warranty obligations to others, but only on a case-by-case basis approved in writing by the Agency. Otherwise, the Contractor shall be solely responsible for the administration of the warranty as specified. Warranty administration by others does not eliminate the warranty liability and responsibility of the Contractor.

WR 1.3.2 Superior Warranty

The Contractor shall pass on to the Agency any warranty offered by a component Supplier that is superior to that required herein. The Contractor shall provide a list to the Agency noting the conditions and limitations of the Superior Warranty not later than the start of production. The Superior Warranty shall not be administered by the Contractor.

WR 1.4 Fleet Defects

WR 1.4.1 Occurrence and Remedy

A Fleet Defect is defined as cumulative failures of twenty-five (25) percent of the same components in the same or similar application. A Fleet Defect shall apply only to the base warranty period in sections entitled "Complete Bus," "Propulsion System" and "Major Subsystems." When a Fleet Defect is declared, the remaining warranty on that item/component stops. The warranty period does not restart until the Fleet Defect is corrected.

For the purpose of Fleet Defects, each option order shall be treated as a separate bus fleet. In addition, should there be a change in a major component within either the base order or an option order, the buses containing the new major component shall become a separate bus fleet for the purposes of Fleet Defects.

The Contractor shall correct a Fleet Defect under the warranty provisions defined in "Repair Procedures." After correcting the Defect, the Agency and the Contractor shall mutually agree to and the Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Defect in all other buses and spare parts purchased under this Contract. Where the specific Defect can be solely attributed to particular identifiable part(s), the work program shall include redesign and/or replacement

of only the defectively designed and/or manufactured part(s). In all other cases, the work program shall include inspection and/or correction of all the buses in the fleet via a mutually agreed-to arrangement. The Contractor shall update, as necessary, technical support information (parts, service and operator's manuals) due to changes resulting from warranty repairs. The Agency may immediately declare a Defect in design resulting in a safety hazard to be a Fleet Defect. The Contractor shall be responsible to furnish, install and replace all defective units.

WR 1.4.2 Exceptions to Fleet Defect Provisions

The Fleet Defect warranty provisions shall not apply to Agency-supplied items, such as radios, fare collection equipment, communication systems and tires. In addition, Fleet Defects shall not apply to interior and exterior finishes, hoses, fittings and fabric.

WR 2. Repair Procedures

WR 2.1 Repair Performance

The Contractor is responsible for all warranty-covered repair Work. To the extent practicable, the Agency will allow the Contractor or its designated representative to perform such Work. At its discretion, the Agency may perform such Work if it determines it needs to do so based on transit service or other requirements. Such Work shall be reimbursed by the Contractor.

WR 2.2 Repairs by the Contractor

If the Agency detects a Defect within the warranty periods defined in this section, it shall, within thirty (30) days, notify the Contractor's designated representative. The Contractor or its designated representative shall, if requested, begin Work on warranty-covered repairs within five calendar days after receiving notification of a Defect from the Agency. The Agency shall make the bus available to complete repairs timely with the Contractor's repair schedule.

The Contractor shall provide at its own expense all spare parts, tools and space required to complete repairs. At the Agency's option, the Contractor may be required to remove the bus from the Agency's property while repairs are being effected. If the bus is removed from the Agency's property, then repair procedures must be diligently pursued by the Contractor's representative.

WR 2.3 Repairs by the Agency

WR 2.3.1 Parts Used

If the Agency performs the warranty-covered repairs, then it shall correct or repair the Defect and any Related Defects utilizing parts supplied by the Contractor specifically for this repair. At its discretion, the Agency may use Contractor-specified parts available from its own stock if deemed in its best interests.

WR 2.3.2 Contractor-Supplied Parts

The Agency may require that the Contractor supply parts for warranty-covered repairs being performed by the Agency. Those parts may be remanufactured but shall have the same form, fit and function, and warranty. The parts shall be shipped prepaid to the Agency from any source selected by the Contractor within fourteen (14) days of receipt of the request for said parts and shall not be subject to an Agency handling charge.

WR 2.3.3 Defective Component Return

The Contractor may request that parts covered by the warranty be returned to the manufacturing plant. The freight costs for this action shall be paid by the Contractor. Materials should be returned in accordance with the procedures outlined in "Warranty Processing Procedures."

WR 2.3.4 Failure Analysis

The Contractor shall, upon specific request of the Agency, provide a failure analysis of Fleet Defect or safety-related parts, or major components, removed from buses under the terms of the warranty that could affect fleet operation. Such reports shall be delivered within 60 days of the receipt of failed parts.

WR 2.3.5 Reimbursement for Labor and Other Related Costs

The Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by the Agency for a qualified mechanic at a straight time wage rate of $65.00 per hour, which includes fringe benefits and overhead adjusted for the Agency's most recently published rate in effect at the time the Work is performed, plus the cost of towing the bus if such action was necessary and if the bus was in the normal service area. These wage and fringe benefit rates shall not exceed the rates in effect in the Agency's service garage at the time the Defect correction is made.

WR 2.3.6 Reimbursement for Parts

The Agency shall be reimbursed by the Contractor for defective parts and for parts that must be replaced to correct the Defect. The reimbursement shall be at the current price at the time of repair and shall include taxes where applicable, plus 15 percent handling costs. Handling costs shall not be paid if parts are supplied by the Contractor and shipped to the Agency.

WR 2.3.7 Reimbursement Requirements

The Contractor shall respond to the warranty claim with an accept/reject decision including necessary failure analysis no later than sixty (60) days after the Agency submits the claim and defective part(s), when requested. Reimbursement for all accepted claims shall occur no later than sixty (60) days from the date of acceptance of a valid claim. The Agency may dispute rejected claims or claims for which the Contractor did not reimburse the full amount. The parties agree to review disputed warranty claims during the following quarter to reach an equitable decision to permit the disputed claim to be resolved and closed. The parties also agree to review all claims at least once per quarter throughout the entire warranty period to ensure that open claims are being tracked and properly dispositioned.

WR 2.4 Warranty after Replacement/Repairs

If any component, unit or subsystem is repaired, rebuilt or replaced by the Contractor or by the Agency with the concurrence of the Contractor, then the component, unit or subsystem shall have the unexpired warranty period of the original. Repairs shall not be warranted if Contractor-provided or authorized parts are not used for the repair, unless the Contractor has failed to respond within five days, in accordance with "Repairs by the Contractor."

If an item is declared to be a Fleet Defect, then the warranty stops with the declaration of the Fleet Defect. Once the Fleet Defect is corrected, the item(s) shall have three (3) months or remaining time and/or miles of the original warranty, whichever is greater. This remaining warranty period shall begin on the repair/replacement date for corrected items on each bus if the repairs are completed by the Contractor or on the date the Contractor provides all parts to the Agency.

WR 2.4.1 Warranty Processing Procedures

The following list represents requirements by the Contractor to the Agency for processing warranty claims. One failure per bus per claim is allowed.

- bus number and VIN
- total vehicle life mileage at time of repair
- date of failure/repair
- acceptance/in-service date
- Contractor part number and description
- component serial number
- description of failure
- all costs associated with each failure/repair (invoices may be required for third-party costs):
    - towing
    - road calls
    - labor
    - materials
    - parts
    - handling
    - troubleshooting time

WR 2.5 Forms

The Agency's forms will be accepted by the Contractor if all of the above information is included. Electronic submittal may be used if available between the Contractor and the Agency.

WR 2.6 Return of Parts

When returning defective parts to the Contractor, the Agency shall tag each part with the following:

- bus number and VIN
- claim number
- part number
- serial number (if available)

WR 2.7 Consumables

The following list of consumable items shall be available in the U.S., preferably from U.S. suppliers:

- Ventilating air filters
- Belts
- Lamps
- Fuses, relays, circuit breakers
- Brake lining material
- Hoses and lines - air, coolant and hydraulic
- Wire terminations and connectors
- Shock absorbers
- Air bags
- Brake drums

- Suspension bushings

WR 2.8 Timeframe

Each claim must be submitted no more than thirty (30) days from the date of failure and/or repair, whichever is later. All defective parts must be returned to the Contractor, when requested, no more than forty-five (45) days from the date of repair.

WR 2.9 Reimbursements

Reimbursements are to be transmitted to the following address:

Pinellas Suncoast Transit Authority (PSTA)
3201 Scherer Drive
Saint Petersburg, Florida 33716
Attention—Accounts Receivable

WR 2.10 Battery Warranty

The high voltage battery will be delivered with a warranty of no less than six (6) years from the time the bus is put into service by the Agency. Contractors offering warranty periods greater than the minimum of six (6) years should notate their warranty period in detail as part of their Proposal.

WR 2.10.1 Battery Definitions

Capacity (electrical energy storage device): Two levels of capacity shall be defined, gross and useable. Gross capacity shall be the capacity energy (kwh) of the entire battery pack and shall include usable, unusable, and/or reserve capacity energy. Useable capacity shall be the capacity energy between the design operating range within the battery management system for normal operation.

Maximum Standard Operating State of Charge: The maximum design operating state of charge as recommended by the propulsion system integrator and battery manufacturer.

Minimum Standard Operating State of Charge: The minimum design operating state of charge as specified by the propulsion system integrator and battery manufacturer.

State of Charge (SOC): Quantity of electric energy remaining in the battery relative to the maximum rated amp hour (AH) capacity of the battery expressed in percent. This is a dynamic measurement used for the energy storage system. An absolute SOC is based on total battery capacity at the beginning of useful life. A relative SOC is based on total degraded capacity at the time of measurement. The actual relationship between the SOC and energy stored expressed as a percentage shall be linear.

Usable Battery Capacity: Usable battery capacity is measured in kwhr and would be the energy available for normal operations. Usable battery capacity would be the usable energy from the ESC as managed through the BMS, assumed to be less than the gross capacity. It is calculated based on a useful range of something above 0% SOC and something less than 100% SOC, i.e., as an example, if the range was between 10% and 90% SOC, then the usable battery capacity would be 80% of gross battery capacity.

WR 2.10.2 Battery Degradation

The contractor shall provide a plan for replacing or reconditioning batteries if it has been determined that the batteries have degraded beyond their warrantable end of life (WEOL). The contractor must clearly define WEOL and the method by which battery capacity is measured to determine WEOL. The contractor must define the capacity to which the entire battery pack is restored such that it will remain above the WEOL for the remainder of the warranty.

WR 2.10.3 Battery End of Life

The Contractor shall provide a plan for battery packs and/or cells that are removed from service over the 12 year life of the bus. The plan may include, but is not limited to, recycling, repurposing, etc.

WR 2.10.4 Battery Cycle and Safety Training

Proposals shall include complete descriptions of all life-cycle testing procedures used to validate the life of batteries used this application at the proposed charging rates, charge durations, and expected ambient temperatures and operating profiles. Contractors shall include documented results of life cycle testing. Contractors shall include certification of battery life cycle testing by independent testing agency.

Proposals shall include complete descriptions of all safety standards followed in the design and manufacture of the battery system, safety testing procedures used to validate the safety of battery operation in this application, and documented results of safety testing to confirm that standards have been met. Contractors shall include certification of battery safety testing by independent testing agency.

SECTION 8: QUALITY ASSURANCE

QA 1. Contractor's In-Plant Quality Assurance Requirements

QA 1.1 Quality Assurance Organization

QA 1.1.1 Organization Establishment

The Contractor shall establish and maintain an effective in-plant quality assurance organization. It shall be a specifically defined organization and should be directly responsible to the Contractor's top management.

QA 1.1.2 Control

The quality assurance organization shall exercise quality control over all phases of production, from initiation of design through manufacture and preparation for delivery. The organization shall also control the quality of supplied articles.

QA 1.1.3 Authority and Responsibility

The quality assurance organization shall have the authority and responsibility for reliability, quality control, inspection planning, establishment of the quality control system, and acceptance/rejection of materials and manufactured articles in the production of the transit buses.

QA 1.2 Quality Assurance Organization Functions

QA 1.2.1 Minimum Functions

The quality assurance organization shall include the following minimum functions:

- **Work instructions:** The quality assurance organization shall verify inspection operation instructions to ascertain that the manufactured product meets all prescribed requirements.

- **Records maintenance:** The quality assurance organization shall maintain and use records and data essential to the effective operation of its program. These records and data shall be available for review by the resident inspectors. Inspection and test records for this procurement shall be available for a minimum of one year after inspections and tests are completed.

- **Corrective action:** The quality assurance organization shall detect and promptly ensure correction of any conditions that may result in the production of defective transit buses. These conditions may occur in designs, purchases, manufacture, tests or operations that culminate in defective supplies, services, facilities, technical data or standards.

QA 1.2.2 Basic Standards and Facilities

The following standards and facilities shall be basic in the quality assurance process:

- **Configuration control:** The Contractor shall maintain drawings, assembly procedures and other documentation that completely describe a qualified bus that meets all of the options and special requirements of this procurement. The quality assurance organization shall verify that each transit bus is manufactured in accordance with these controlled drawings, procedures and documentation.

- **Measuring and testing facilities:** The Contractor shall provide and maintain the necessary gauges and other measuring and testing devices for use by the quality assurance organization to verify that the buses conform to all specification requirements. These devices shall be calibrated at established

periods against certified measurement standards that have known, valid relationships to national standards.

- **Production tooling as media of inspection:** When production jigs, fixtures, tooling masters, templates, patterns and other devices are used as media of inspection, they shall be proved for accuracy at formally established intervals and adjusted, replaced or repaired as required to maintain quality.

- **Equipment use by resident inspectors:** The Contractor's gauges and other measuring and testing devices shall be made available for use by the resident inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.

QA 1.2.3 Maintenance of Control

The Contractor shall maintain quality control of purchases:

- **Supplier control:** The Contractor shall require each Supplier to maintain a quality control program for the services and supplies that it provides. The Contractor's quality assurance organization shall inspect and test materials provided by Suppliers for conformance to specification requirements. Materials that have been inspected, tested and approved shall be identified as acceptable to the point of use in the manufacturing or assembly processes. Controls shall be established to prevent inadvertent use of nonconforming materials.

- **Purchasing data:** The Contractor shall verify that all applicable specification requirements are properly included or referenced in purchase orders of articles to be used on transit buses.

QA 1.2.4 Manufacturing Control

- **Controlled conditions:** The Contractor shall ensure that all basic production operations, as well as all other processing and fabricating, are performed under controlled conditions. Establishment of these controlled conditions shall be based on the documented Work instructions, adequate production equipment and special working environments if necessary.

- **Completed items:** A system for final inspection and test of completed transit buses shall be provided by the quality assurance organization. It shall measure the overall quality of each completed bus.

- **Nonconforming materials:** The quality assurance organization shall monitor the Contractor's system for controlling nonconforming materials. The system shall include procedures for identification, segregation and disposition.

- **Statistical techniques:** Statistical analysis, tests and other quality control procedures may be used when appropriate in the quality assurance processes.

- **Inspection status:** A system shall be maintained by the quality assurance organization for identifying the inspection status of components and completed transit buses. Identification may include cards, tags or other normal quality control devices.

QA 1.2.5 Inspection System

The quality assurance organization shall establish, maintain and periodically audit a fully documented inspection system. The system shall prescribe inspection and test of materials, Work in process and completed articles. As a minimum, it shall include the following controls:

- **Inspection personnel:** Sufficient trained inspectors shall be used to ensure that all materials, components and assemblies are inspected for conformance with the qualified bus design.

- **Inspection records:** Acceptance, rework or rejection identification shall be attached to inspected articles. Articles that have been accepted as a result of approved materials review actions shall be identified. Articles that have been reworked to specified drawing configurations shall not require special identification. Articles rejected as unsuitable or scrap shall be plainly marked and controlled to prevent installation on the bus. Articles that become obsolete as a result of engineering changes or other actions shall be controlled to prevent unauthorized assembly or installation. Unusable articles shall be isolated and then scrapped. Discrepancies noted by the Contractor or resident inspectors during assembly shall be entered by the inspection personnel on a record that accompanies the major component, subassembly, assembly or bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures or other conditions that cause articles to be in nonconformity with the requirements of the Contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, then the Agency shall approve the modification, repair or method of correction to the extent that the Contract specifications are affected.

- **Quality assurance audits:** The quality assurance organization shall establish and maintain a quality control audit program. Records of this program shall be subject to review by the Agency.

QA 2. Inspection

QA 2.1 Inspection Stations

Inspection stations shall be at the best locations to provide for the Work content and characteristics to be inspected. Stations shall provide the facilities and equipment to inspect structural, electrical, hydraulic and other components and assemblies for compliance with the design requirements.

Stations shall also be at the best locations to inspect or test characteristics before they are concealed by subsequent fabrication or assembly operations. These locations shall minimally include underbody structure completion, body framing completion, body prior to paint preparation, water test, engine installation completion, underbody dress-up and completion, bus prior to final paint touchup, bus prior to road test and bus final road test completion.

QA 2.2 Resident Inspectors

QA 2.2.1 Resident Inspector's Role

The Agency shall be represented at the Contractor's plant by resident inspectors, as required by FTA. Resident inspectors may be Agency employees or outside contractors. The Agency shall provide the identity of each inspector and shall also identify his or her level of authority in writing. They shall monitor, in the Contractor's plant, the manufacture of transit buses built under the procurement. The presence of these resident inspectors in the plant shall not relieve the Contractor of its responsibility to meet all the requirements of this procurement. The Agency shall designate a primary resident inspector, whose duties and responsibilities are delineated in "Pre-Production Meetings," "Authority" and "Pre-Delivery Tests," below.

Contractor and resident inspector relations shall be governed by the guidelines included as Attachment A to this section.

QA 2.2.2 Pre-Production Meetings

The primary resident inspector may participate in design review and Pre-Production Meetings with the Agency. At these meetings, the configuration of the buses and the manufacturing processes shall be finalized, and all Contract documentation provided to the inspector.

No less than thirty (30) days prior to the beginning of bus manufacture, the primary resident inspector may meet with the Contractor's quality assurance manager and may conduct a pre-production audit meeting. They shall review the inspection procedures and finalize inspection checklists. The resident inspectors may begin monitoring bus construction activities two weeks prior to the start of bus fabrication.

QA 2.2.3 Authority

Records and data maintained by the quality assurance organization shall be available for review by the resident inspectors. Inspection and test records for this procurement shall be available for a minimum of one year after inspections and tests are completed.

The Contractor's gauges and other measuring and testing devices shall be made available for use by the resident inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.

Discrepancies noted by the resident inspector during assembly shall be entered by the Contractor's inspection personnel on a record that accompanies the major component, subassembly, assembly or bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures or other conditions that cause articles to be in nonconformity with the requirements of the Contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, then the Agency shall approve the modification, repair or method of correction to the extent that the Contract specifications are affected.

The primary resident inspector shall remain in the Contractor's plant for the duration of bus assembly Work under this Contract. Only the primary resident inspector or designee shall be authorized to release the buses for delivery. The resident inspectors shall be authorized to approve the pre-delivery acceptance tests. Upon request to the quality assurance supervisors, the resident inspectors shall have access to the Contractor's quality assurance files related to this procurement. These files shall include drawings, assembly procedures, material standards, parts lists, inspection processing and reports, and records of Defects.

QA 2.2.4 Support Provisions

The Contractor shall provide office space for the resident inspectors in close proximity to the final assembly area. This office space shall be equipped with desks, outside and interplant telephones, Internet access, file cabinet and chairs.

QA 2.2.5 Compliance with Safety Requirements

At the time of the Pre-Production Meeting, the Contractor shall provide all safety and other operational restrictions that govern the Contractor's facilities. These issues will be discussed and the parties will agree which rules/restrictions will govern the Agency's inspector(s) and any other Agency representatives during the course of the Contract.

QA 3. Acceptance Tests

QA 3.1 Responsibility

Fully documented tests shall be conducted on each production bus following manufacture to determine its acceptance to the Agency. These acceptance tests shall include pre-delivery inspections and testing by the Contractor and inspections and testing by the Agency after the buses have been delivered.

QA 3.2 Pre-Delivery Tests

The Contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to the Agency. These pre-delivery tests shall include visual and measured inspections, as well as testing the total bus operation. The tests shall be conducted and documented in accordance with written test plans approved by the Agency.

Additional tests may be conducted at the Contractor's discretion to ensure that the completed buses have attained the required quality and have met the requirements in "Section 6: Technical Specifications." The Agency may, prior to commencement of production, demand that the Contractor demonstrate compliance with any requirement in that section if there is evidence that prior tests have been invalidated by the Contractor's change of Supplier or change in manufacturing process. Such demonstration shall be by actual test, or by supplying a report of a previously performed test on similar or like components and configuration. Any additional testing shall be recorded on appropriate test forms provided by the Contractor and shall be conducted before acceptance of the bus.

The pre-delivery tests shall be scheduled and conducted with thirty (30) days' notice so that they may be witnessed by the resident inspectors, who may accept or reject the results of the tests. The results of pre-delivery tests, and any other tests, shall be filed with the assembly inspection records for each bus. The underfloor equipment shall be available for inspection by the resident inspectors, using a pit or bus hoist provided by the Contractor. A hoist, scaffold or elevated platform shall be provided by the Contractor to easily and safely inspect bus roofs. Delivery of each bus shall require written authorization of the primary resident inspector. Authorization forms for the release of each bus for delivery shall be provided by the Contractor. An executed copy of the authorization shall accompany the delivery of each bus.

QA 3.2.1 Visual and Measured Inspections

Visual and measured inspections shall be conducted with the bus in a static condition. The purpose of the inspection testing includes verification of overall dimension and weight requirements, that required components are included and are ready for operation, and that components and subsystems designed to operate with the bus in a static condition do function as designed.

QA 3.2.2 Total Bus Operation

Total bus operation shall be evaluated during road tests. The purpose of the road tests is to observe and verify the operation of the bus as a system and to verify the functional operation of the subsystems that can be operated only while the bus is in motion.

Each bus shall be driven for a minimum of fifteen (15) miles during the road tests. If requested, computerized diagnostic printouts showing the performance of each bus shall be produced and provided to the Agency. Observed Defects shall be recorded on the test forms. The bus shall be retested when Defects are corrected and adjustments are made. This process shall continue until Defects or required adjustments are no longer detected.

Attachment A: New Bus Manufacturing Inspection Guidelines

Pre-Production Meeting

Responsibilities

Agency

- Provides conformed copy of technical requirements.
- Recommended staff to be involved may include the following:
    - Project manager
    - Technical engineer
    - Contract administrator
    - Quality assurance administrator
    - Warranty administrator
- Process for inspector's role (to deal with Agency) for negotiated changes after freeze date.
- Contractual requirements:
    - Milestones
    - Documentation
    - Title requirements
    - Deliverables
    - Payments
    - Reliability tracking

Manufacturer

- Identifies any open issues.
- Recommended staff to be involved may include the following:
    - Project manager
    - Technical engineer(s)
    - Contract administrator
    - Quality assurance administrator
    - Warranty administrator
- Production flow (buses/week, shifts).
- Delivery schedule and offsite component build-up schedule.
- Bus QA documentation (including supplier application approvals and/or any certifications required for the specific production).
- Communication flow/decision making.

Inspector

- Agree on decisions inspectors can and cannot make.
- Primary contact for problems, etc.
- Production flow process (description of manufacturing by station).
- Factory hours (manage inspection schedule based on production hours).
- Plant rules.
- Safety requirements.
- Orientation requirements.
- Work environment.
- Inspector's office space (per contract).

Build Schedule

The bus manufacturer's contract administrator shall supply a fleet build production schedule based on the dates in the Notice to Proceed, and a description of the manufacturer's schedule for plant operations.

The production schedule should contain specific milestone dates, such as the following:

- First vehicle on production line (date on which any work will begin)
- First vehicle off production line
- First vehicle through manufacturer's quality assurance inspections
- First vehicle shipped to the Agency
- Last vehicle on production line
- Last vehicle off production line
- Last vehicle shipped to the Agency

Plant Tour (if Meeting at OEM's Location)

The Agency will review the entire process from start to finish and review the work completed at each line station, including quality control measures.

Prototype/Pilot Vehicle Production

The Contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to the Agency. These pre-delivery tests shall include visual and measured inspections, as well as testing the total bus operation. The tests shall be conducted and documented in accordance with written test plans approved by the Agency. The underfloor equipment shall be available for inspection by the resident inspectors, using a pit or bus hoist provided by the Contractor. A hoist, scaffold or elevated platform shall be provided by the Contractor to easily and safely inspect bus roofs. Delivery of each bus shall require written authorization of the primary resident inspector. Authorization forms for the release of each bus for delivery shall be provided by the Contractor. An executed copy of the authorization shall accompany the delivery of each bus.

Additional tests may be conducted at the Agency's discretion to ensure that the completed buses have attained the required quality and have met the requirements in "Section 6: Technical Specifications." The Agency may, prior to commencement of production, demand that the Contractor demonstrate compliance with any requirement in that section if there is evidence that prior tests have been invalidated by the Contractor's change of Supplier or change in manufacturing process. Such demonstration shall be by actual test, or by supplying a report of a previously performed test on similar or like components and configuration. Any additional testing shall be recorded on appropriate test forms provided by the Contractor and shall be conducted before acceptance of the bus.

The pre-delivery tests shall be scheduled and conducted with 30 days' notice so that they may be witnessed by the resident inspectors, who may accept or reject the results of the tests. The results of pre-delivery tests, and any other tests, shall be filed with the assembly inspection records for each bus.

Visual and Measured Inspections

Visual and measured inspections shall be conducted with the bus in a static condition. The purpose of the inspection testing includes verification of overall dimension and weight requirements, that required components are included and are ready for operation, and that components and subsystems designed to operate with the bus in a static condition do function as designed.

Total Bus Operation

Total bus operation shall be evaluated during road tests. The purpose of the road tests is to observe and verify the operation of the bus as a system and to verify the functional operation of the subsystems that can be operated only while the bus is in motion.

Each bus shall be driven for a minimum of 15 miles during the road tests. If requested, computerized diagnostic printouts showing the performance of each bus shall be produced and provided to the Agency. Observed defects shall be recorded on the test forms. The bus shall be retested when defects are corrected and adjustments are made. This process shall continue until defects or required adjustments are no longer detected.

Post-Delivery Tests

The Agency shall conduct acceptance tests on each delivered bus. These tests shall be completed within 15 days after bus delivery and shall be conducted in accordance with the Agency's written test plans. The purpose of these tests is to identify defects that have become apparent between the time of bus release and delivery to the Agency. The post-delivery tests shall include visual inspection and bus operations. No post-delivery test shall apply new criteria that are different from criteria applied in a pre-delivery test.

Buses that fail to pass the post-delivery tests are subject to non-acceptance. The Agency shall record details of all defects on the appropriate test forms and shall notify the Contractor of acceptance or non-acceptance of each bus, after completion of the tests. The defects detected during these tests shall be repaired according to procedures defined in the contract.

Prototype/Pilot Vehicle Acceptance

In order to assess the Contractor's compliance with the Technical Specifications, the Agency and the Contractor shall, at the Pre-Production Meeting, jointly develop a Configuration and Performance Review document for review of the pilot vehicle. This document shall become part of the official record of the Pre-Production Meeting.

Potential dimensional/performance tests included in the Configuration and Performance Review are the following:

- Complete electrical system audit
- Dimensional requirements audit
- Seating capacity
- Water test
- Water runoff test
- Function test of systems/subsystems and components
- Sound/noise level tests
- Vehicle top speed
- Acceleration tests
- Brake stop tests
- Airflow tests
- PA function tests
- Air/brake system audit
- Individual axle weight
- Standee capacity
- Body deflection tests
- Silent alarm function test
- Interior lighting
- Exterior lighting
- Gradeability test
- Kneeling system function
- HVAC pull down/heat
- Speedometer

- Outside air infiltration (smoke)
- Wheelchair ramps
- Propulsion system performance verification
- ESS charging verification
    -

Buy America Audit

A post-delivery Buy America audit is required for federally funded bus procurements (see 49 CFR Part 663 for additional information). The on-site resident inspectors will monitor the production processes to verify compliance with final assembly requirements identified by the Buy America pre-award audit. This audit is to verify compliance with final assembly requirements and final documentation of Buy America compliance and must be completed prior to title transfer.

Resident Inspection Process for Serial Production

At the discretion of the Agency, a decision may be made to perform resident inspection using the Agency's personnel, a contract inspector, or a combination of both. The decision is based on factors such as the availability of personnel, knowledge/expertise in bus build project management, the size of the bus order, etc.

Resident Inspector Orientation

A resident inspector orientation by the bus manufacturer should take place upon the arrival of the initial inspection team. The orientation should include expectations for the use of personal protective equipment (safety shoes, safety glasses, etc.), daily check-in and check-out requirements, lines of communication, use of production documents such as speed memos and line movement charts, inspector/production meetings, inspector office arrangements, and anything else pertinent to the inspection team's involvement during the build. Many of the above items should already be formalized during the Pre-Production Meeting.

Audits, Inspections and Tests

The resident inspection process monitors the production of each vehicle. Inspection stations shall be strategically placed to test or inspect components or other installations before they are concealed by subsequent fabrication or assembly operations. These locations typically are placed for the inspection of underbody structure, body framing, electrical panels and harnesses, air and hydraulic line routings, installation of insulation, power plant build-up and installation, rust inhibitor/undercoating application, floor installation, front suspension alignment, and other critical areas.

Vehicle Inspections

Each bus is subjected to a series of inspections after the bus reaches the point of final completion on the assembly line. Typically, the vehicle manufacturer performs its own quality assurance inspections following assembly line completion before releasing each bus to the resident inspectors. The inspections for each vehicle are documented, signed off upon passing and included in the vehicle record.

The inspections performed on each bus by the resident inspectors will include the following:

- Water test inspection
- Road test inspection
- Interior inspection (including functionality)
- Hoist/undercarriage inspection
- Exterior inspection (including roof)
- Electrical inspection
- Wheelchair ramp/lift inspection

Water Test Inspection

The water test inspection checks the integrity of the vehicle's body seams, window frame seals and other exterior component closeouts for their ability to keep rainwater, road splash, melting snow and slush, and other exterior water from entering the inside of the vehicle. The vehicle's interior is inspected for signs of moisture and water leaks. To perform the leak inspection, interior ceiling and side panels are removed, and access doors are opened. If any moisture or water is detected, then the source of the leak will be located and repaired by the manufacturer, and the vehicle will be tested again.

Road Test Inspection

The road test inspection checks all the vehicle's systems and subsystems while the vehicle is in operation. Typically, the road test inspection is performed immediately following the water test inspection to reveal any standing water that may be present due to a leak, but was not noticed during the "static" water test. Objectionable vibrations, air leakage and other factors that affect ride quality are recorded and reported to the vehicle manufacturer for resolution. Vehicle stability, performance, braking and interlock systems, HVAC, and other critical areas are checked to ensure that the vehicle is complete and ready to provide safe and reliable service.

The following tests may be performed and recorded during the road test:

- Acceleration test
- Top speed test
- Gradeability test
- Service brake test
- Parking brake test
- Turning effort test
- Turning radius test
- Shift quality
- Quality of retarder or regenerative braking action

During the road test, a vehicle may be taken to a weigh station to record the vehicle's front axle weight, rear axle weight and total vehicle (curb) weight.

Interior Inspection

The interior inspection checks the fit and finish of the interior installations.

In addition, the inspection also verifies the installation and function of systems and subsystems according to the Build Specification. All systems and functions accessed from the interior are inspected for functionality, appearance and safety.

Examples of systems/functions inspected include the following:

- Interior and exterior lighting controls
- Front and rear door systems
- Flooring installation
- Passenger and operator's seat systems
- Wheelchair securement and ramp systems
- Fire suppression system
- Electrical installations (multiplex, tell-tale wiring, panels, etc.)
- Window systems and emergency escape portals
- Operator dash/side panel controls/indicators

Hoist/Undercarriage Inspection

The hoist/undercarriage inspection checks the installation of components, wiring, air lines, presence of fluid leaks, etc., located under the vehicle. Typically, this inspection is performed following the road test. The vehicle is lifted onto a hoist or pulled over a pit for the inspection. Areas inspected are the front suspension, air bags, airline routings, electrical connections and routings, drivetrain components, linkages and any other system or component that may be prone to early failure due to inadequate installation techniques. All lines, cables, hoses, etc., are inspected for proper securement and protection to prevent rubbing, chafing or any other condition that could result in a failure. The powerplant and HVAC compartments are also inspected during this time.

Exterior Inspection

The exterior inspection checks the fit and finish of components installed on the exterior of the vehicle. Access panels are opened and accessories are inspected for proper installation. In addition, vehicle paint, graphics and proper decals are also inspected. Acceptable paint finish quality (orange peel, adhesion, etc.) should be agreed on with the vehicle manufacturer prior to production to ensure consistency of inspections.

Electrical Inspection

The vehicle's main electrical panels and other subpanels are inspected for proper components, to include relays, fuses, modules, terminal strips, decals, etc. In addition, electrical harnesses are inspected for proper wiring and termination techniques, bulkhead protection, looming and other items that could result in future electrical failure. Onboard vehicle compartment schematics are verified for accuracy.

Wheelchair Ramp Inspection

The wheelchair ramp assembly is inspected for proper installation and performance. Clearances critical to the operation of the ramp are verified, and the ramp's electrical systems are inspected to ensure appropriate wire routings and protection. The successful integration of the ramp assembly into the vehicle is verified, and the vehicle interlocks are checked during automatic and manual ramp operation.

Audits

During serial production of the bus's quality assurance inspection, tests may be performed to ensure that the manufacturer's quality standards are being followed. These inspection audits could be on items such as torque wrench calibrations, proper techniques for fastener installations, proper use and type of adhesives, use of correct installation drawings on the production line, etc.

Communications

The lines of communications, formal and informal, should be discussed and outlined in the Pre-Production Meeting. As previously discussed, resident inspectors should represent the Agency for all bus-build related issues (quality, conformance, etc.).Resident inspectors can relay communications addressing contractual type issues but should do so only under the consult of the Agency's contract administrator. Actual personnel contacts for the manufacturing facility should be established during resident inspector orientation. These contacts could include quality assurance, production, material handling, engineering and buy-off area personnel.

Documentation

The following documents/reports are generated during the bus build process:

- Vehicle build specification
- Sales order

- Pre-Production Meeting notes
- Prototype and production correspondence (vehicle build file)
- Manufacturer's vehicle record (Warranty file)
    - Vehicle line documents
    - Serialization documents (Warranty file)
    - Alignment verification
    - Brake testing
    - HVAC testing and checkout
    - Manufacturer's QA checklist and signoff
    - Weight slip (prototype and Warranty file)
    - Prototype performance tests document (vehicle build file)
        - Acceleration Test
        - Top Speed Test
        - Gradeability Test
        - Interior Noise Test A – Stationary
        - Interior Noise Test B – Dynamic
        - Exterior Noise Test A – Pull Away
        - Exterior Noise Test B – Pass-By
        - Exterior Noise Test C – Curb Idle
        - Turning Radius Test
        - Turning Effort Test
        - Parking Brake Test
        - Service Brake Test
    - Vehicle acceptance inspections—production (Warranty file)
        - Water Test Inspection Report
        - Road Test Inspection Report
        - Interior Inspection Report
        - Hoist/Undercarriage Inspection Report
        - Exterior Inspection Report
        - Electrical Inspection Report
        - Wheelchair Inspection Report
    - Speed Memos (Warranty file)
    - Agency Vehicle Inspection record(Warranty file)
    - Release for delivery documentation (Warranty file)
    - Post-Production Acceptance – Certificate of Acceptance(Accounting)
    - Post-Delivery Inspection Report – (Fleet Management & Warranty files)

Vehicle Release for Delivery

Upon satisfactory completion of all inspection, audit and test criteria, and resolution of any outstanding issues affecting the purchase of any or all buses, proper documentation (the Release for Delivery) is signed by the designated resident inspector authorizing the bus manufacturer to deliver the vehicle to the Agency's facility, where it will undergo a post-delivery inspection process and final acceptance. The satisfactory sign-off of the Release for Delivery should complete the resident inspector's duties for each bus. In final preparation for delivery, the bus manufacturer may request the resident inspector to do a final walk-through of the bus after it has been cleaned and prepped for shipping.

Post-Delivery and Final Acceptance

The Agency shall conduct acceptance tests on each delivered bus. These tests shall be completed within 15 days after bus delivery and shall be conducted in accordance with the Agency's written test plans. The purpose of these tests is to identify defects that have become apparent between the time of bus release and

delivery to the Agency. The post-delivery tests shall include visual inspection, along with a verification of system(s) functionality and overall bus operations. No post-delivery test shall apply new criteria that are different from criteria applied in a pre-delivery test.

Buses that fail to pass the post-delivery tests are subject to non-acceptance. The Agency shall record details of all defects on the appropriate test forms and shall notify the Contractor of acceptance or non-acceptance of each bus within five days after completion of the tests. The defects detected during these tests shall be repaired according to procedures defined in the contract after non-acceptance.

Certificate of Acceptance

- **Accepted**

- **Not accepted:** In the event that the bus does not meet all requirements for acceptance. The Agency must identify reasons for non-acceptance and work with the OEM to develop a timeline of addressing the problem for a satisfactory resolution and redelivery.

- **Conditional acceptance:** In the event that the bus does not meet all requirements for acceptance, the Agency may conditionally accept the bus and place it into revenue service pending receipt of Contractor furnished materials and/or labor necessary to address the identified issue(s).

SECTION 9: FORMS AND CERTIFICATIONS

CER 1. Proposer's Checklist

RFP [21-980369 **Electric Transit Buses with Charging and Associated Equipment**

Package 1: Technical Proposal

- ☐ 1. Letter of Transmittal
- ☐ 2. Technical Proposal
- ☐ 3. Acknowledgement of Addenda
- ☐ 4. Form for Proposal Deviation
- ☐ 5. Vehicle Questionnaire
- ☐ 6. References and non-priced information (if provided by Proposer)
- ☐ 7. Engineering organization chart, engineering change control procedure, field modification process
- ☐ 8. Manufacturing facility plant layout, other contracts, staffing
- ☐ 9. Production schedule and other Contract commitments for the duration of this Contract.
- ☐ 10. Quality Assurance Program

Package 2: Price Proposal

- ☐ 1. Letter of Transmittal
- ☐ 2. Pricing Schedule (including option buses, spare parts package, engineering, manuals, training, special tools and test equipment)

Package 3: Qualifications Package

- ☐ 1. Pre-Award Evaluation Data Form
- ☐ 2. A copy of the three (3) most recent audited financial statements or a statement from the Proposer regarding how financial information may be reviewed by the Agency
- ☐ 3. Letter for insurance
- ☐ 4. Letter for performance bond (if applicable)
- ☐ 5. Letter of commitment for parental financial guarantee (if applicable)
- ☐ 6. Proposal Form

Package 4: Proprietary/Confidential Information

- ☐ 1. Proprietary/Confidential Information

There may be items in the first three packages that are included in Package 4 because they are considered to be proprietary/confidential information. When this occurs, the Proposer must note that fact in packages 1 through 3.

CER 2. Request for Pre-Offer Change or Approved Equal

This form must be used for requested clarifications, changes, substitutes or approval of items equal to items specified with a brand name and must be submitted as far in advance of the Due Date, as specified in "Questions, Clarifications and Omissions."

Pinellas Suncoast Transit Authority RFP 21-980369 Electric Transit Buses with Charging and Associated Equipment

Request #: **Proposer:** **RFP Section:** **Page:**		
Questions/clarification or approved equal:		
Agency action:	□ Approved □ See addendum	□ Denied □ See response below
Agency response:		

CER 3. Acknowledgement of Addenda

Failure to acknowledge receipt of all addenda may cause the Proposal to be considered nonresponsive to the Solicitation. Acknowledged receipt of each addendum must be clearly established and included with the Proposal.

The undersigned acknowledges receipt of the following addenda to the documents: Addendum No.: Dated: Addendum No.: Dated: Addendum No.: Dated: Addendum No.: Dated:
Proposer: **Name:** **Title:** **Phone:** **Street address:** **City, state, ZIP:**
_____ Authorized signature Date

CER 4. Contractor Service and Parts Support Data

Location of nearest Technical Service Representative to Agency

Name:
Address:
Telephone:
Describe technical services readily available from said representative:

Location of nearest Parts Distribution Center to Agency:

Name:
Address:
Telephone:
Describe the extent of parts available at said center:

Policy for delivery of parts and components to be purchased for service and maintenance:

Regular method of shipment:
Cost to Agency:

CER 5. Form for Proposal Deviation

This form shall be completed for each condition, exception, reservation or understanding (i.e., Deviation) in the Proposal according to "Conditions, Exceptions, Reservations or Understandings." One copy without any price/cost information is to be placed in the Technical Proposal as specified in "Technical Proposal Requirements," and a separate copy with any price/cost information placed in the Price Proposal as specified in "Price Proposal Requirements."

PSTA
[RFP 21-980369]

Deviation No.:	**Contractor:**	**RFP section:**	**Page:**
Complete description of Deviation:			
Rationale (pros and cons):			

CER 6. Pricing Schedule

This form is to be completed and included in the Price Package.

RFP 21-980369 Electric Transit Buses with Charging and Associated Equipment

Battery Leasing

PSTA is requesting all Proposers submit detailed information pertaining to the ability to lease the onboard ESS battery packs from the manufacturer; if available. Proposers should provide all pricing, financing terms, interest rates, along with duration of leasing term as part of their Proposal.

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA) RFP 21-98369

SCHEDULE

CAUTION: A false statement in any offer submitted to PSTA may be a criminal OFFENSE.

NOTE: For Invitations for Bids the terms "Offer" and "Offeror" shall mean "Bid" and "Bidder", respectively; and for Request for Proposals the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.

The rates include all costs that the offeror(s) intends to recover, such as, but not limited to: supervision, labor, equipment, materials, vehicle licensing, vehicle title, pick-up, financing, carrying charges, and all other such charges to accommodate the services and requirements. No price adjustments will be made, unless specifically provided for by an additional provision included in this contract.

PRICING

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
1	Cost of (1) 30FT, low floor, all electric bus, per the specifications		1					
2	Cost of (1) 35FT, low floor, all electric bus, per the specifications		1					
3	Cost of (1) 40FT, low floor, all electric bus, per the specifications		1					
4	Cost of (1) Depot Charger		1					
5	ADVERTISING FRAMES	None	1					

6	ADVERTISING FRAMES	Advertising Frame - Interior 22" X 21",RH Load, Open Back, Clear Aluminum Finish	1					
7	ADVERTISING FRAMES	(1) Information Board (#15-55401-000)	1					
8	AIR SYSTEM	Bendix AD9 Air Dryer	1					
9	AIR SYSTEM	Shop Air Connection (Milton S790)	1					
10	AIR SYSTEM	Kingston Auto Drain Valve at Ping Tanks	1					
11	AIR SYSTEM	Bendix ADIP , Heated, Air Dryer	1					
12	AIR SYSTEM	Bendix Puraguard Air / Oil Separator	1					
13	AIR SYSTEM	Chicago Rawhide Dual Turbo 2000 Air Dryer	1					
14	AIR SYSTEM	Graham White Sludge Braker QBA15 Air Dryer	1					
15	AIR SYSTEM	Graham White Sludge Braker QBA60 Air Dryer	1					
16	AIR SYSTEM	Haldex Consep Moisture Ejector, Heated, at Air Dryer	1					
17	AIR SYSTEM	SKF, HCT 2000 Duraguard, 24V Heated, Filtration Plus Air Dryer	1					
18	AIR SYSTEM	SKF, HCT_2000 Duraguard Air Dryer	1					
19	AIR SYSTEM	Wabco SS 1800, Heated, Air Dryer	1					
20	AIR SYSTEM	Shop Air Connection (Milton 770)	1					
21	AIR SYSTEM	Shop Air Connection (Milton 727)	1					
22	AUTOMATIC PASSENGER COUNTER	UTA APC Sensors, Cabling, CPU Only (Integrated w/ ITS)	1					
23	AUTOMATIC PASSENGER COUNTER	UTA Automatic Passenger Counter System with GPS, WLAN Capabilities	1					

24	AUTOMATIC PASSENGER COUNTER	UTA Automatic Passenger Counter System with GPS, WLAN Capabilities (without APC software & Wi-Fi data transfer	1					
25	AUTOMATIC PASSENGER COUNTER	Clever Devices Clever-Count System	1					
26	AXLES & SEALS	Stud Piloted Wheels and Axles w/ Oil Seals	1					
27	AXLES & SEALS	Synthetic 75W90 Gear Oil	1					
28	AXLES & SEALS	Hub Piloted Wheels and Axles w/ Grease Seals	1					
29	AXLES & SEALS	Hub Piloted Wheels, Axles with Oil Seals	1					
30	AXLES & SEALS	Stud Piloted Wheels and Axles w/ Grease Seals	1					
31	AXLES & SEALS	Rear Axle Oil Drain Plug--Magnetic Internal Hex Head Plug	1					
32	BATTERIES	(2) DEKA 8D Side or Top Post Connections	1					
33	BATTERIES	Anderson 350 Jump Start Connector (Front & Rear)	1					
34	BATTERIES	Group 31 Batteries	1					
35	BATTERIES	Anderson 350 Jump Start Connector (Each)	1					
36	BATTERIES	Anderson 350 Jump Start Delete	1					
37	BIKE RACKS	Sportworks DL2, 2-Position, Stainless Steel	1					
38	BIKE RACKS	Bike Rack Deployed Indicator Lamp on Driver's Dash	1					
39	BIKE RACKS	Sportworks APEX 2, 2-Position, Stainless Steel	1					
40	BIKE RACKS	Sportworks APEX 2, 2-Position, Powder Coated	1					
41	BIKE RACKS	Sportworks DL2, 2-Position, Powder Coated	1					
42	BIKE RACKS	Sportworks APEX3, 3-Position, Stainless Steel	1					

43	BIKE RACKS	Sportworks APEX 3, 3-Position, Powder Coated	1					
44	BIKE RACKS	Sportworks Trilogy (DL3), 3-Position, Stainless Steel	1					
45	BIKE RACKS	Sportworks Trilogy (DL3), 3-Position, Powder Coated	1					
46	BIKE RACKS	Sportworks Pivot Plate Only	1					
47	BIKE RACKS	Sportworks Mounting Brackets Only	1					
48	BIKE RACKS	Byk-Rak, 2-Position, Stainless Steel	1					
49	BIKE RACKS	Byk-Rak, 2-Position, Powder Coated	1					
50	BIKE RACKS	Byk-Rak, 3-Position, Stainless Steel	1					
51	BIKE RACKS	Byk-Rak, 3-Position, Powder Coated	1					
52	BIKE RACKS	Byk-Rak Pivot Plate Only	1					
53	BIKE RACKS	Byk-Rak-Mounting Brackets Only	1					
54	BRAKES	MGM E-Stroke Brake Wear Monitoring System	1					
55	BRAKES	Four Wheel Disc Brakes with ABS	1					
56	COMMUNICATIONS SYSTEM	DC Power Filter for Radio Wiring	1					
57	COMMUNICATIONS SYSTEM	Power Circuit (Route to RH Dash & Electrical Equipment Box) Roof Mount RF/GPS/Cellular Antenna	1					
58	COMMUNICATIONS SYSTEM	Motorola APX 4500	1					
59	COMMUNICATIONS SYSTEM	Motorola APX 6500	1					
60	COMMUNICATIONS SYSTEM	Harris XG-25M	1					
61	COMMUNICATIONS SYSTEM	Antenna Specialist ASP 572 Antenna	1					
62	COMMUNICATIONS SYSTEM	Antenna Specialist ASP 931 Antenna	1					
63	COMMUNICATIONS SYSTEM	Antenna Specialist ASP 930T Antenna with	1					

		RG58 coax cable and TNC connector						
64	COMMUNICA-TIONS SYSTEM	GPS Antenna (Trimble 502 Model 18334)	1					
65	DESTINATION SIGNS	Hanover 100% White LED Sign (17 x 160)--Front ,Side, Rear	1					
66	DESTINATION SIGNS	Hanover 100% Amber LED Sign (17 x 160)--Front ,Side, Rear	1					
67	DESTINATION SIGNS	Hanover 100% Full Color LED Sign (17 x 160)--Front ,Side, Rear	1					
68	DESTINATION SIGNS	Hanover--Add Front Run Sign--White LED	1					
69	DESTINATION SIGNS	Hanover--Add Front Run Sign--Amber LED	1					
70	DESTINATION SIGNS	Hanover--Add Front Run Sign--Color LED	1					
71	DESTINATION SIGNS	Hanover--Delete Rear Sign	1					
72	DESTINATION SIGNS	Hanover Program Soft-ware	1					
73	DESTINATION SIGNS	TwinVision Smart Se-ries 3 100% Silver LED Sign (16 X 160)--Front, Side, and Rear	1					
74	DESTINATION SIGNS	TwinVision Smart Se-ries 3 100% Amber LED Sign (16 x 160)--Front, Side, and Rear	1					
75	DESTINATION SIGNS	Luminator Titan Silver Series LED Sign (24 X 200)--Front, Side, and Rear	1					
76	DESTINATION SIGNS	Luminator Titan Amber Series Sign (24 x 200)--Front, Side, and Rear	1					
77	DESTINATION SIGNS	Luminator GEN 4 Horizon 100% Silver LED Sign (16 x 160)--Front, Side , and Rear	1					
78	DESTINATION SIGNS	Luminator GEN 4 Horizon 100% Amber LED Sign (16x 160)--Front, Side , and Rear	1					
79	DESTINATION SIGNS	Luminator Spectrum 100% Full Color LED	1					

		GEN IV Front Sign (16 x 112)						
80	DESTINATION SIGNS	Luminator/Twinvision--Add Front Run Sign--Amber LED	1					
81	DESTINATION SIGNS	Luminator/Twinvision--Add Front Run Sign--Silver LED	1					
82	DESTINATION SIGNS	Luminator/Twinvision--Add Front Run Sign--Color LED	1					
83	DESTINATION SIGNS	Luminator RearView Camera Integraded into Rear LED Sign	1					
84	DESTINATION SIGNS	Luminator Rearview Camera without Rear LED Sign	1					
85	DESTINATION SIGNS	Luminator--Delete Rear Sign	1					
86	DESTINATION SIGN SOFT-WARE	Luminator Program Software	1					
87	DESTINATION SIGN SOFT-WARE	TwinVision Program Software	1					
88	DESTINATION SIGN SOFT-WARE	Luminator Destination Sign Wireless Program-ming	1					
89	DOOR SYSTEM--FRONT	OEM Standard Air Open/Spring Close Front Door with Full Driver Control--31.75" Minimum Doorway Clear Width	1					
90	DOOR SYSTEM--REAR	OEM Standard Air Open/Spring Close Rear Door with Full Driver Control--31.75" Minimum Doorway Clear Width	1					
91	DOOR SYSTEM--REAR	Add Touch Bars (Air Open / Spring Close) at Rear Door with Driver Override	1					
92	DOOR SYSTEM--REAR	Add Touch Tape at Rear Doors	1					
93	DOOR SYSTEM	Add Exterior Air Re-lease (Front Door Con-trol Valve)	1					

94	DOOR SYSTEM	Add Vapor Class 5 Position Analog Controller	1					
95	DOOR SYSTEM	Add Push Button Door Controls	1					
96	DOOR SYSTEM	Add--Vapor Activair Differential Engine for Slide-Glide Doors	1					
97	DOOR SYSTEM	Add--Vapor CLASS Acoustic (Photo Sensor)	1					
98	DOOR SYSTEM	Add--Vapor Digital Door Control - DDC	1					
99	DOOR SYSTEM	Add--Vapor Electric Transit Operator - ETO	1					
100	DOOR SYSTEM	Add--Vapor Light Touch Bars	1					
101	DOOR SYSTEM	Add--Vapor Optical Pressure Switch - OPS	1					
102	DRIVER BARRIER	None	1					
103	DRIVER BARRIER	Drivers Barrier Storage Box	1					
104	DRIVER BARRIER	Driver's Security Enclosure	1					
105	DRIVER BARRIER	Flat Melamine, Two Piece	1					
106	DRIVER BARRIER	Plexiglass Drivers Security Enclosure Door	1					
107	DRIVER BARRIER	Wrap Around Fiberglass Drivers Barrier	1					
108	DRIVER BARRIER	Wraparound fiberglass, without schedule holders, with drivers barrier grap handle	1					
109	DRIVER CONTROLS	Williams Controls 41 Degree Throttle and Brake Pedal (Non-Adjustable)	1					
110	DRIVER CONTROLS	Kongsberg Adjustable Throttle and Brake Pedal	1					
111	DRIVER CONTROLS	Teleflex Adjustable Throttle and Brake Pedal	1					
112	DRIVER CONTROLS	12 V Cigarette Light Adaptor for PC	1					

		auxilary power- Drivers area						
113	DRIVER HEAT-ERS	Dash Fan	1					
114	DRIVERS SEAT	USSC G2A Evolution, with Fabric, with 3-Point Belt (Lap & Shoulder)	1					
115	DRIVERS SEAT	Recaro Ergo Metro, with Fabric, with 2-Point Belt (Lap)	1					
116	DRIVERS SEAT	Recaro Ergo Metro, with Fabric, with 3-Point Belts (Lap & Shoulder)	1					
117	DRIVERS SEAT	Add Vinyl Upholstery to Recaro Ergo Metro	1					
118	DRIVERS SEAT	Add Orange Shoulder Belt to Recaro Ergo Metro	1					
119	DRIVERS SEAT	Add Adjustable D-Ring to Recaro Ergo Metro	1					
120	DRIVERS SEAT	Add Headrest to Recaro Ergo Metro	1					
121	DRIVERS SEAT	Add Drivers Seat Va-cancy Alarm to Recaro Ergo Metro	1					
122	DRIVERS SEAT	Add Seat Belt Alarm to Recaro Ergo Metro	1					
123	DRIVERS SEAT	USSC 9100 ALX, with Fabric, with 2-Point Belt (Lap)	1					
124	DRIVERS SEAT	USSC 9100 ALX, with Fabric, with 3-Point Belt (Lap & Shoulder)	1					
125	DRIVERS SEAT	USSC G2 Evolution, with Fabric, with 2-Point Belt (Lap)	1					
126	DRIVERS SEAT	USSC G2 Evolution, with Fabric, with 3-Point Belt (Lap & Shoulder)	1					
127	DRIVERS SEAT	USSC G2A Evolution, with Fabric, with 2-Point Belt (Lap)	1					
128	DRIVERS SEAT	USSC Q Series, with Fabric, with 2-Point Belt (Lap)	1					

129	DRIVERS SEAT	USSC Q Series, with Fabric, with 3-Point Belt (Lap & Shoulder)	1					
130	DRIVERS SEAT	Add Vinyl Upholstery to USSC Seat	1					
131	DRIVERS SEAT	Add Orange Shoulder Belt to USSC Seat	1					
132	DRIVERS SEAT	Add Adustable D-Ring to USSC Seat	1					
133	DRIVERS SEAT	Add Headrest to USSC Seat	1					
134	DRIVERS SEAT	Add Drivers Seat Va-cancy Alarm to USSC Seat	1					
135	DRIVERS SEAT	Add Seat Belt Alarm to USSC Seat	1					
136	ELECTRICAL EQUIPMENT CABINET	44"H x 22.5"W x 20"D, 1-Door	1					
137	ELECTRICAL EQUIPMENT CABINET	33"H x 20"D x 22.5"W, 2-Doors	1					
138	ELECTRICAL EQUIPMENT CABINET	33"H x 20"D x 22.5"W, 1-Door	1					
139	ELECTRICAL EQUIPMENT CABINET	33"H x 20"D x 22.5"W, 1-Door, Louvered Back Panel	1					
140	ELECTRICAL EQUIPMENT CABINET	8.25"H x 20"W x 13"D, 1-Door, Curbside Wheelhousing Storage Box	1					
141	ELECTRICAL EQUIPMENT CABINET	Add 5/16" Square Key Lock--Each	1					
142	ELECTRICAL EQUIPMENT CABINET	Add Exhaust Ventila-tion Fan--Each	1					
143	ELECTRICAL EQUIPMENT CABINET	Add Standard Key Lock--Each	1					
144	EXTERIOR LIGHTS	4" Diameter LED Tail Lights--Turn, Tail, Stop, Reverse	1					
145	EXTERIOR LIGHTS	4 LED Headlights (Low & High Beam)	1					
146	EXTERIOR LIGHTS	7" Diameter LED Tail Lights--Turn, Tail, Stop, Reverse	1					

147	EXTERIOR LIGHTS	Add 4" Diameter LED Brake Light--Each	1					
148	EXTERIOR LIGHTS	Add 7" Diameter LED Brake Light--Each	1					
149	EXTERIOR LIGHTS	Add 18" Red LED Strip Brake Light--Each	1					
150	EXTERIOR LIGHTS	Add 18" Amber LED Strip Brake Light--Each	1					
151	EXTERIOR LIGHTS	Add Red LED "STOP" Sign	1					
152	EXTERIOR LIGHTS	Add Amber Triangle Style LED "Yield" Sign	1					
153	EXTERIOR LIGHTS	2 LED Headlights (Low Beam Only)	1					
154	EXTERIOR LIGHTS	2 LED Headlights (High Beam Only)	1					
155	EXTERIOR LIGHTS	Dual Halogen Headlights (Low & High Beam Only)	1					
156	EXTERIOR LIGHTS	Fog Lights	1					
157	EXTERIOR MIRRORS	B&R 10"x11", 2-Piece, Heated, Remote Control (Both Sides)	1					
158	EXTERIOR MIRRORS	B&R 8"x8", 1-Piece, Remote Control Both Sides, Stainless Steel Arms	1					
159	EXTERIOR MIRRORS	B&R 8"x10", 2-Piece, Heated, Remote Control (Both Sides)	1					
160	EXTERIOR MIRRORS	B&R 8"x15", 2-Piece, Heated, Remote Control (Both Sides)	1					
161	EXTERIOR MIRRORS	B&R 10"x13", 1-Piece, Heated, Remote Control (Both Sides)	1					
162	EXTERIOR MIRRORS	Delete Remote Control (Per Side)	1					
163	EXTERIOR MIRRORS	Add Turn Signal Indicator on Exterior Mirror Head	1					
164	EXTERIOR MIRRORS	5" Mirror Front Bike Rack Mirror	1					
165	FARE COLLECTION	No Farebox , Provide Power Circuit and Groundstrap Only	1					

166	FARE COLLEC-TION	GFI 41" Tall Odyssey	1					
167	FARE COLLEC-TION	Add Farebox Lamp, Ceiling mounted	1					
168	FARE COLLEC-TION	Install Customer Provided Farebox Base Plate	1					
169	FIRE SUPPRES-SION SYSTEM	Fogmaker Water Mist Fire Suppression System	1					
170	FIRE SUPPRES-SION SYSTEM	Amerex V-25 Fire Suppression System	1					
171	FIRE SUPPRES-SION SYSTEM	Kidde Dual Spectrum LTD Fire Detection and Suppression System	1					
172	FIRE SUPPRES-SION SYSTEM	Add Kidde Armored LTD	1					
173	FIRE SUPPRES-SION SYSTEM	Add Kidde TLSE	1					
174	FIRE SUPPRES-SION SYSTEM	Add Kidde Optical Sensor (each)	1					
175	FLOORING	Greenwood ACQ Plywood	1					
176	FLOORING	Altro Transflor	1					
177	FLOORING	RCA Rubber Flooring	1					
178	FLOORING	Composite Sub Floor	1					
179	FLOORING	Gerflor Tarabus Helios Flooring	1					
180	FLOORING	Stainless Steel Trim on Risers and Wheelhousings	1					
181	FRAME	None	1					
182	FRAME	Engine Skid Protection with Extended Tow Eyes	1					
183	FRAME	Engine Skid Protection W/ Extended Tow Eyes & 2" Thick x 2" Wide Wear Plate	1					
184	FRAME	Reinforced A-Post Skid Plates (Per Side)	1					
185	FRAME	Frame Undercoating	1					
186	GAUGES--DRIV-ERS DASH	Speedometer, Air Pressure Gauge, 12/24 volt Gauges, Coolant Temp Gauge, State of Charge	1					
187	GAUGES--DRIV-ERS DASH	Add Low State of Charge Alarm	1					

188	GAUGES--DRIVERS DASH	Add Low State of Charge Warning Indicator	1					
189	GAUGES--DRIVERS DASH	Add Engine Hour Meter	1					
190	GAUGES--DRIVERS DASH	Add Auxiliary Stop Request Light	1					
191	GAUGES--DRIVERS DASH	Add Mutil Function Display (MFD)	1					
192	HEATING/AIR CONDITIONING	Thermo King TE-14 All-Electric	1					
193	HEATING/AIR CONDITIONING	Sutrak All-Electric HVAC SYSTEM--(Roof Mounted/Rear Mounted HVAC system)	1					
194	HEATING/AIR CONDITIONING	SanUVAire- Safe Breathe Air Purification System	1					
195	HEATING/AIR CONDITIONING	Thermo King Pressure and Return Display Mounted to Unit	1					
196	HUBOMETER	Veeder Root Mechanical without Tenths, without Guard	1					
197	HUBOMETER	E J Ward Data System (Includes CANceiver, Display Unit, and Antenna)	1					
198	HUBOMETER	Engler (Stemco) Mechanical without Tenths, without Guard	1					
199	HUBOMETER	S/A Fleetwatch Data Logger JX 55	1					
200	HUBOMETER	Add Hubodometer Guard	1					
201	INTERIOR LIGHTS	LED Interior Lights	1					
202	INTERIOR MIRRORS	8.25" x 16" Interior Rear View Mirror, Flat Faced	1					
203	INTERIOR MIRRORS	12" Convex at Rear Door Stanchion	1					
204	INTERIOR MIRRORS	6" Flat Faced Spot Mirror at Bottom of Front Destination Sign Compartment	1					
205	INTERIOR MIRRORS	4.75" x 15" Interior Mirror, Flat Faced	1					

206	ITS SYSTEM	None	1					
207	ITS SYSTEM	Avail IVU with MDC, GPS, APC, and WLAN	1					
208	ITS SYSTEM	Avail System Pre-Wire (IVU, MDT, APC, Fare Box)	1					
209	ITS SYSTEM	Clever Devices IVN 5 (AVL/GPS/CAD/Automatic Stop Annunciation)	1					
210	ITS SYSTEM	Clever Devices Automatic Vehicle Monitoring System	1					
211	ITS SYSTEM	Clever Devices BusTime System	1					
212	ITS SYSTEM	Clever Devices CleverCAD System	1					
213	ITS SYSTEM	Clever Devices CleverVision	1					
214	ITS SYSTEM	Clever Devices Secure Bus Access System	1					
215	ITS SYSTEM	Clever Devices Turn Warning System	1					
216	ITS SYSTEM	Opticom Traffic Signal Priority	1					
217	ITS SYSTEM	MobileEye Collision Avoidance System	1					
218	ITS SYSTEM	Transloc Transit Visualization System AVL	1					
219	ITS SYSTEM	Intelligent Vehicle System Prewire Only (Pending System Specification)	1					
220	ITS SYSTEM	Luminator InfoTransit--2 Monitors (18.5") Proxys Module	1					
221	ITS SYSTEM	Luminator InfoTransit--Upgrade to 29" Monitors	1					
222	ITS SYSTEM	Luminator InfoTransit--Upgrade to 37" Monitors	1					
223	ITS SYSTEM	Luminator InfoLite--2 Monitors (18.5") Proxys Module	1					
224	ITS SYSTEM	Luminator InfoLite--Upgrade to 29" Monitors	1					

225	ITS SYSTEM	Luminator InfoLite--Upgrade to 37"Monitors	1					
226	MISCELLANOUS	Scissor Style Sunshades--Drivers Windows	1					
227	MISCELLANOUS	Drivers Coat Hook	1					
228	MISCELLANOUS	Roller Style Sunshades--Drivers Windows	1					
229	MISCELLANOUS	Euramatic Cup Holder	1					
230	MISCELLANOUS	Registration Card holder	1					
231	MISCELLANOUS	Stainless Steel Waste Basket and Bracket	1					
232	MODESTY PANELS	Standard Melamine Panels on Lower Section	1					
233	MODESTY PANELS	Quick Changing Glazing Upper Clear Plexiglas Modesty Panels Both Sides of Rear Exit Door	1					
234	MODESTY PANELS	Front Door Modesty Panel	1					
235	MODESTY PANELS	Lower Modesty Panel Forward of Rear Door	1					
236	MODESTY PANELS	Melamine Panel Lower Section (Aft Rear Door)	1					
237	MODESTY PANELS	Upper Clear Plexiglas Modesty Panel Forward Rear Door	1					
238	PAINT	One Color w/ Black Mask at Windows	1					
239	PAINT	Add--Additional Color--Per Pass	1					
240	PAINT	Add--Clear Coat	1					
241	PAINT	Add Roof Numbers	1					
242	PAINT	Custom Paint / Decal Design (Per Spec)	1					
243	PASSENGER BARRIERS	Wheelchair Barrier--Curbisde Aft of ADA Area	1					
244	PASSENGER BARRIERS	Wheelchair Barrier--Streetside Aft of ADA Area	1					

245	PASSENGER SEATING	USSC 4ONE Gemini	1					
246	PASSENGER SEATING	Kiel North America Citos	1					
247	PASSENGER SEATING	Kiel North America Intra	1					
248	PASSENGER SEATING	USSC 4One Angel	1					
249	PASSENGER SEATING	AMSECO Vision	1					
250	PASSENGER SEATING	AMSECO Insight	1					
251	PASSENGER SEATING	AMESCO Insight Prime Plus	1					
252	PASSENGER SEATING	Add--USB Charging Ports at Passenger Locations	1					
253	PASSENGER SEATING	Add--Hinged Rear Settee	1					
254	PASSENGER SEATING	Add--3rd Step To Perimeter Seating (Except Settee)	1					
255	PASSENGER SIGNALS	Pull Cords (Neutral) with Touch Pad at Wheelchair Location	1					
256	PASSENGER SIGNALS	Stop Request Button At Rear Door Stanchion	1					
257	PASSENGER SIGNALS	Touch Tape (At Window Mullions)	1					
258	PASSENGER WINDOWS	Ricon Hidden Frame/Bonded--Full Fixed	1					
259	PASSENGER WINDOWS	Ricon Standard Frame, Safety Glass--Full Sliders	1					
260	PASSENGER WINDOWS	Ricon Standard Frame, Safety Glass--Full Fixed	1					
261	PASSENGER WINDOWS	Add Thermo Guard to Ricon Standard Frame	1					
262	PASSENGER WINDOWS	Add Thermo Guard to Ricon Hidden Frame/Bonded	1					
263	PASSENGER WINDOWS	Arow Standard Frame, Safety Glass--Full Sliders	1					
264	PASSENGER WINDOWS	Arow Standard Frame, Safety Glass--Full Fixed	1					

265	PASSENGER WINDOWS	Arow Hidden Frame/Bonded--Full Fixed	1					
266	PASSENGER WINDOWS	Add Thermo Guard to Arow Standard Frame	1					
267	PASSENGER WINDOWS	Add Thermo Guard to Arow Hidden Frame/Bonded	1					
268	PASSENGER WINDOWS	Add Window Guards (Acrylic or Film)	1					
269	PUBLIC AN-NOUNCEMENT SYSTEM	PA with Handheld Mic w / (8) Flush Mount Speakers 40' (6) w / 30'	1					
270	PUBLIC AN-NOUNCEMENT SYSTEM	(1) Interior/Both/Exte-rior Speaker Selct Tog-gle Switch without Guard & (1) Rheostat Volume Control with XLR Mic Jack	1					
271	PUBLIC AN-NOUNCEMENT SYSTEM	Boom Microphone--Soundview SVA50SF (24") without ON/OFF Switch on Microphone, Momentary Button toe Switch, Floor Bracket Mounted	1					
272	PUBLIC AN-NOUNCEMENT SYSTEM	Clever Devises - Speakeasy II	1					
273	PUBLIC AN-NOUNCEMENT SYSTEM	Luminator VAS Sys-tem	1					
274	PUBLIC AN-NOUNCEMENT SYSTEM	Clever Devices Auto-mated Voice An-nouncement System	1					
275	REAR RUN GAUGES	Add Hour Meter	1					
276	REAR RUN GAUGES	Add A/C Hour Meter	1					
277	REAR RUN GAUGES	Add Coolant Tempera-ture--Mechanial	1					
278	REAR RUN GAUGES	Add Coolant Tempera-ture--Electrical	1					
279	REAR RUN GAUGES	Add Voltmeter (12V or 24V)	1					
280	ROOF HATCHES	Manual Hatch at Front and Rear Positions	1					
281	ROOF HATCHES	Delete (1) Roof hatch	1					

282	SAFETY EQUIPMENT	5LBS ABC Fire Extinguisher (Mounted Behind Driver Seat)	1					
283	SAFETY EQUIPMENT	Safety Triangles (K-D 610-4645)	1					
284	SAFETY EQUIPMENT	Bio- Hazard Disposal Kit	1					
285	SAFETY EQUIPMENT	Blood Born Pathogens Kit	1					
286	SAFETY EQUIPMENT	Ten Unit First Aid Kit	1					
287	SAFETY EQUIPMENT	Wheel Chocks (Per Set)	1					
288	SCHEDULE RACK	NONE	1					
289	SCHEDULE RACK	(1) Schedule Holder OBIC 20/9 4PW-49/923BO- 4 Slots,Gray Color	1					
290	SCHEDULE RACK	22" x 21" Black, RH Load Open Back	1					
291	SCHEDULE RACK	Innocom Schedule Racks 3.75" x 7" x 1.5"	1					
292	SCHEDULE RACK	Innocom Schedule Racks 8.62" x 1 1" x 1"	1					
293	SCHEDULE RACK	OBIC To (4) Quad Pamphlet & (1) Single Pamphlet Holders	1					
294	SCHEDULE RACK	Transit Info Products OBICT10P2LTRMC	1					
295	SCHEDULE RACK	Transit Information Products -19"x 21" OBIC 19/214P1LTRMC	1					
296	STANCHIONS/GRAB RAILS	Stainless Steel Vertical Stanchions, Grabrails, and Modesty Panel Tubes	1					
297	STANCHIONS/GRAB RAILS	Vinyl Coated Nylon Grab Straps--Each	1					
298	STANCHIONS/GRAB RAILS	Yellow Powder Coated Vertical Stanchions, Grab Rails, and Modesty Panel Tubes	1					
299	STANCHIONS/GRAB RAILS	Yellow Powder Coated Vertical Stanchions Only	1					

300	STAN-CHIONS/GRAB RAILS	Vehicle Stanchion at Front Wheel Wells--Each	1					
301	STAN-CHIONS/GRAB RAILS	Add Farebox Grabrail	1					
302	STAN-CHIONS/GRAB RAILS	Horizontal Grabrail on Curbside & Streetside Wheelhousing	1					
303	STAN-CHIONS/GRAB RAILS	SSTL Spring Loaded Grab Handle--Each	1					
304	STEERING SYS-TEM	Douglas, Single Tilt, Without Column Turn Signal, Without High-Low Beam Switch	1					
305	STEERING SYS-TEM	Steering Wheel--Standard 20" Non-Padded 3 Spoke Wheel with Center Horn Button	1					
306	STEERING SYS-TEM	Ross Model TS 65	1					
307	STEERING SYS-TEM	Steering Box--TRW TAS6505	1					
308	STEERING SYS-TEM	TRW Electric Assisted Steering	1					
309	STEEERING SYSTEM	VIP Textured Steering Wheel	1					
310	STYLING PACK-AGES	Standard Styling Package	1					
311	STYLING PACK-AGES	Windshield 2-Piece	1					
312	STYLING PACK-AGES	Windshield 1-Piece	1					
313	STYLING PACK-AGES	BRT Front Cap Styling Only	1					
314	STYLING PACK-AGES	BRT Front Cap, Rear Cap and Engine Door Styling	1					
315	STYLING PACK-AGES	BRT PLUS Front Cap, Rear Cap, Roof Line and Engine Door Styling	1					
316	STYLING PACK-AGES	BRT Roof Fairings, Front or Rear (each)	1					
317	SURVEILLANCE CAMERA SYS-TEMS	Apollo (8) Standard Definition Color Camera System, 6TB HDD,	1					

		GPS, Wireless, Impact Sensor						
318	SURVEILLANCE CAMERA SYSTEMS	Apollo--Add (1) Standard Definition Coler Camera	1					
319	SURVEILLANCE CAMERA SYSTEMS	Apollo--Delete (1) Standard Definition Color Camera	1					
320	SURVEILLANCE CAMERA SYSTEMS	Apollo--Add (1) High Definition Color Camera	1					
321	SURVEILLANCE CAMERA SYSTEMS	Apollo--Add 8TB HDD	1					
322	SURVEILLANCE CAMERA SYSTEMS	Apollo Back Up Camera with LCD Screen	1					
323	SURVEILLANCE CAMERA SYSTEMS	SEON NX-16 (7) Camera System, 2TB HDD, Wireless, GPS, Impact Sensor	1					
324	SURVEILLANCE CAMERA SYSTEMS	SEON Add (1) Standard Definition Color Camera	1					
325	SURVEILLANCE CAMERA SYSTEMS	SEON Add (1) High Definition Color Camera	1					
326	SURVEILLANCE CAMERA SYSTEMS	SEON Add Solid State Harddrive (SSD)	1					
327	SURVEILLANCE CAMERA SYSTEMS	AngelTrax (7) Standard Definition Color Camera System, 1TB HDD, Wireless, GPS, Impact Sensor	1					
328	SURVEILLANCE CAMERA SYSTEMS	AngelTrax--Add (1) Standard Definition Color Camera	1					
329	SURVEILLANCE CAMERA SYSTEMS	AngelTrax--Add (1) High Definition Color Camera	1					
330	SURVEILLANCE CAMERA SYSTEMS	AngelTrax--Add 1TB HDD (Double stacked 500GB HDD)	1					
331	SURVEILLANCE CAMERA SYSTEMS	March Network 5412 (10) Camera--Kalatel Mobileview	1					

332	SURVEILLANCE CAMERA SYS-TEMS	Mobileview NVR7000 (10) Camera System, High Definition, 4TB HDD, Wireless, GPS, Impact Sensor	1					
333	SURVEILLANCE CAMERA SYS-TEMS	Mobileview--Add (1) High Definition Cam-era	1					
334	SURVEILLANCE CAMERA SYS-TEMS	Mobileview--Add Solid State Harddrive (SSD)	1					
335	SURVEILLANCE CAMERA SYS-TEMS	REI Bus Watch Digital	1					
336	SURVEILLANCE CAMERA SYS-TEMS	Camera Pre Wire Pack-age	1					
337	TIRES	Agency Supplied Tires	1					
338	TIRES	OEM Supplied Tires	1					
339	TIRES	Tire Pressure Monitor-ing System	1					
340	TOWING	None	1					
341	TOWING	Cole Hersee 12063 Electrical Tow Con-nector	1					
342	TOWING	Delete Cole Hersee Tow Connector	1					
343	WHEELCHAIR RAMP	Lift U--Ramp (LU-18 Dual Mode Front Door Ramp Only)	1					
344	WHEELCHAIR RAMP	Ricon--6:1 Ratio, Sin-gle Slope Ramp – SSR - Front Door Only	1					
345	WHEELCHAIR RAMP	Ricon – 4:1 Ratio, FR2E - Front Door Only	1					
346	WHEELCHAIR SECUREMENT	USSC--V-PRO-Reliant	1					
347	WHEELCHAIR SECUREMENT	Kiel North America K-Pod with Secubar	1					
348	WHEELCHAIR SECUREMENT	American Seating--Dual Auto Lok with Advanced Restraint Module (ARM)	1					
349	WHEELCHAIR SECUREMENT	American Seating--Ad-vanced Restraint Mod-ule (ARM) with Re-mote Belt Release	1					

350	WHEELCHAIR SECUREMENT	American Seating--Q'Straint Q'Pod	1					
351	WHEELCHAIR SECUREMENT	USSC--Q'Straint Q' POD	1					
352	WHEELCHAIR SECUREMENT	Q'Straint Quantum	1					
353	WHEELCHAIR SECUREMENT	Belt Guard and Wheelchair Ramp Pan Identification Numbers	1					
354	WHEELS/RIMS	(7) Alcoa Aluminum Polished Finish with Durabrite	1					
355	WHEELS/RIMS	(7) Steel Powder Coated Finish, White or Black	1					
356	WHEELS/RIMS	(7) Alcoa Aluminum Clean & Buff Finish	1					
357	WHEELS/RIMS	(7) Alcoa Aluminum Polished Finish	1					
358	WHEELS/RIMS	(7) Alcoa Aluminum Clean & Buff Finish with Durabrite	1					
359	WHEELS/RIMS	Alcoa Wheels--Add Duraflange	1					
360	WHEELS/RIMS	Delete Spare Aluminum Wheel	1					
361	WHEELS/RIMS	Delete Spare Steel Wheel	1					
362	DECALS & SIGNAGE	ADA Priority Seat Decals--"PLEASE OFFER THESE SEATS TO THE ELDERLY AND PERSONS WITH DISABILITIES", White on Clear	1					
363	DECALS & SIGNAGE	Drivers Instructions & Warning--English, Black on White	1					
364	DECALS & SIGNAGE	Interior Rear Step Floor Decals--"WATCH YOUR STEP", White Lettering on Red Background	1					
365	DECALS & SIGNAGE	Interior Symbol Decals (3)--ISO Symbols, No Smoking/Eating/Drinking/Radio. White on Black	1					

366	DECALS & SIGNAGE	Vehicle Height Decal--English "Caution Clearance Height XX FT XX IN, Black on Yellow	1					
367	DECALS & SIGNAGE	Drivers /Passengers Standee Warning Decal for Florida--"It Is A Violation For This Bus To Be In Operation With Passengers Occupying The Area Forward Of Yellow Line. Therefore Passengers May Not Stand Forward Of The Yellow Line While Bus Is In Motion." White on Black	1					
368	DECALS & SIGNAGE	Wheechair Securement Decals--"WHEELCHAIR SEATING AREA SECUREMENTS ARE LOCATED BELOW THESE SEATS", Black on Optically Clear	1					
369	DECALS & SIGNAGE	TrilingualDecals	1					
370	DECALS & SIGNAGE	Yield Sign Decal	1					
371	MANUALS	Drivers, Service, Parts, Electrical, Vendor (Hardcopy) & Compact Disc (CD)--1 Set Hardcopy & 1 CD (Up to 3 buses ordered)	1					
372	MANUALS	Additional Driver's Handbook--Each	1					
373	MANUALS	Additional Service Manual (Hardcopy)--Each	1					
374	MANUALS	Additional Parts Manual (Hardcopy)--Each	1					
375	MANUALS	Additional Electrical Schematics (Hardcopy)--Each	1					
376	MANUALS	Additional Drivers, Service, Parts, or	1					

		Electrical Schematics (CD)--Each						
377	MANUALS	Additional Vendor Manuals (Hardcopy)--Each	1					
378	MANUALS	Additional Vendor Manuals (CD)--Each	1					
379	TRAINING	Operator Orientation Training--By Bus Manufacturer at Agency Property (Per Driver/Per Class)	1					
380	TRAINING	Maintenance Orientation Training--By Bus Manufacturer at Agency Property (Per Technician/Per Class)	1					
381	TRAINING	Steering System--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
382	TRAINING	Chassis & Body--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
383	TRAINING	Door Systems--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
384	TRAINING	Suspension--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
385	TRAINING	Electrical & Electronics----By Bus Manufacturer and/or OEM Supplier at Agency Property (Per Technician/Per Class)	1					
386	TRAINING	Air & Brake Systems--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
387	TRAINING	HVAC & Climate Controls--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					

388	TRAINING	Wheelchair Ramp--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
389	TRAINING	Destination Sign--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
390	TRAINING	Fire Suppression--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
391	TRAINING	Camera System Training--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
392	TRAINING	Automatic Passenger Counting System--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
393	TRAINING	Fare Collection Training--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
394	TRAINING	ITS Technical Training--By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
395	TRAINING	EV HV Battery ESS By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
396	TRAINING	EV Proplusion Operation & Diagnostics By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
397	TRAINING	High Voltage Safety By OEM Supplier at Agency Property (Per Technician/Per Class)	1					
398	TRAINING MODULES	Thermo-King Intelligaire Training Module	1					
399	TRAINING MODULES	I/O Controls Multiplex Board	1					

400	TRAINING MODULES	Air Brake Training Board	1					
401	TRAINING MODULES	Vapor Door Training Module	1					
402	BATTERY	Battery Lease	1yr					
TOTAL								

PRICE OFFER	
TOTAL PRICE	
TOTAL PRICE OFFER --->	**$**

NAME & TITLE OF OFFEROR'S REPRESENTATIVE: (print or type)	**SIGNATURE & DATE:**
(Name & Title)	(Signature of Offeror's Representative) Date
(Offeror's Name)	

CER 7. Pre-Award Evaluation Data Form

NOTE: This form is to be completed and included in the Qualification Package. Attach additional pages if required.

PSTA
RFP 21-980369

1. Name of firm: **2. Address:** **3.** □ **Individual** □ **Partnership** □ **Corporation** □ **Joint Venture** **4. Date organized:** **State in which incorporated:** **5. Names of officers or partners:** a. b. c. d. e. **6. How long has your firm been in business under its present name?**
7. Attach as **SCHEDULE ONE** a list of similar current contracts that demonstrates your available capacity, including the quantity and type of bus, name of contracting party, percentage completed and expected completion date. 8. Attach as **SCHEDULE TWO** a list of at least three similar contracts that demonstrates your technical proficiency, each with the name of the contracting party and number and they type of buses completed within the last five years. **9. Have you been terminated or defaulted, in the past five years, on any Contract you were awarded?** □ Yes □ No If yes, then attach as **SCHEDULE THREE** the full particulars regarding each occurrence. 10. Attach as **SCHEDULE FOUR** Proposer's last three (3) financial statements prepared in accordance with generally accepted accounting principles of the jurisdiction in which the Proposer is located, and audited by an independent certified public accountant; or a statement from the Proposer regarding how financial information may be reviewed by the Agency (This may require execution of an acceptable nondisclosure agreement between the Agency and the Proposer.) 11. Attach as **SCHEDULE FIVE** a list of all principal Subcontractors and the percentage and character of Work (Contract amount) that each will perform on this Contract. 12. If the Contractor or Subcontractor is a joint venture, submit **PRE-AWARD EVALUATION DATA** forms for each member of the joint venture.
The above information is confidential and will not be divulged to any unauthorized personnel.
The undersigned certifies to the accuracy of all information: **Name and title:** **Company:** _____ Authorized signature Date

CER 8. Federal Certifications

CER 8.1 Buy America Certification

This form is to be submitted with an offer exceeding the small purchase threshold for federal assistance programs, currently set at $$150,000.

Certificate of Compliance

The Contractor hereby certifies that it will comply with the requirements of 49 USC 5323(j)(1) and (13), as amended, and the regulations of 49 CFR 661.11:

Name and title:
Company:

_____

Authorized signature Date

OR

Certificate of Non-Compliance

The Contractor hereby certifies that it cannot comply with the requirements of 49 USC 5323(j)(1) and (13), as amended, but may qualify for an exception to the requirements consistent with 49 USC 5323(j)(1) and (13), as amended, and regulations in 49 CFR 661.7.

Name and title:
Company:

_____

Authorized signature Date

CER 8.2 Debarment and Suspension Certification for Prospective Contractor

Primary covered transactions must be completed by Proposer for contract value over $25,000.

Choose one alternative:

☐ The Proposer, [insert name], certifies to the best of its knowledge and belief that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency;
2. Have not within a three-year period preceding this Proposal been convicted of or 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) transaction or Contract under a public transaction; violation of federal or state antitrust statutes or commission or embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
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 2 of this certification; and
4. Have not within a three-year period preceding this Proposal had one or more public transactions (federal, state or local) terminated for cause or default.

OR

☐ The Proposer is unable to certify to all of the statements in this certification, and attaches its explanation to this certification. (In explanation, certify to those statements that can be certified to and explain those that cannot.)

The Proposer certifies or affirms the truthfulness and accuracy of the contents of the statements submitted on or with this certification and understands that the provisions of Title 31 USC § Sections 3801 are applicable thereto.

Executed in [insert city and state]**.**

Name:

_____

Authorized signature Date

CER 8.3 Debarment and Suspension Certification (Lower-Tier Covered Transaction)

This form is to be submitted by each Subcontractor receiving an amount exceeding $25,000.

The prospective lower-tier participant (Proposer) certifies, by submission of this Proposal, that neither it nor its "principals" as defined at 49 CFR § 29.105(p) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency.

If the prospective Proposer is unable to certify to the statement above, it shall attach an explanation, and indicate that it has done so by placing an "X" in the following space: _____

THE PROPOSER, _____, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF EACH STATEMENT OF ITS CERTIFICATION AND EXPLANATION, IF ANY. IN ADDITION, THE PROPOSER UNDERSTANDS AND AGREES THAT THE PROVISIONS OF 31 USC §§ 3801 *ET SEQ*. APPLY TO THIS CERTIFICATION AND EXPLANATION, IF ANY.

Name and title of the Proposer's authorized official:

_____

Authorized signature Date

CER 8.4 Non-Collusion Affidavit

This affidavit is to be filled out and executed by the Proposer; if a corporation makes the bid, then by its properly executed agent. The name of the individual swearing to the affidavit should appear on the line marked "Name of Affiant." The affiant's capacity, when a partner or officer of a corporation, should be inserted on the line marked "Capacity." The representative of the Proposer should sign his or her individual name at the end, not a partnership or corporation name, and swear to this affidavit before a notary public, who must attach his or her seal.

State of _____, County of _____

I, _____, being first duly sworn, do hereby state that
(Name of Affiant)

I am _____ of _____
(Capacity) (Name of Firm, Partnership or Corporation)

whose business is

_____

and who resides at

_____

and that

_____
(Give names of all persons, firms, or corporations interested in the bid)

is/are the only person(s) with me in the profits of the herein contained Contract; that the Contract is made without any connection or interest in the profits thereof with any persons making any bid or Proposal for said Work; that the said Contract is on my part, in all respects, fair and without collusion or fraud, and also that no members of the Board of Trustees, head of any department or bureau, or employee therein, or any employee of the Agency, is directly or indirectly interested therein.

_____
Signature of Affiant Date

The foregoing instrument was sworn to before me by means of ☐ physical presence or ☐ online notarization this _____ day of _____, 20_____, by _____(name), as _____(type of authority)_____ on behalf of the ___(type of business entity)_____. She/he is [ ] personally known to me or [ ] has produced _____ (type of identification) as identification.

_____
Notary public My commission expires

Seal

CER 8.5 Lobbying Certification

This form is to be submitted with an offer exceeding $100,000.

The Proposer certifies, to the best its knowledge and belief, that:

1. No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of a federal department or agency, a member of the U.S. Congress, an officer or employee of the U.S. Congress, or an employee of a member of the U.S. 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 thereof.

2. If any funds other than federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal Contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instruction, as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96).

3. 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 sub recipients 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, USC § 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.

THE PROPOSER, _____, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF EACH STATEMENT OF ITS CERTIFICATION AND DISCLOSURE, IF ANY. IN ADDITION, THE PROPOSER UNDERSTANDS AND AGREES THAT THE PROVISIONS OF 31 USC §§ 3801 ET SEQ. APPLY TO THIS CERTIFICATION AND DISCLOSURE, IF ANY.

Name of the bidder or Proposer's authorized official:

_____

Title:

_____

_____

Signature Date

Per paragraph 2 of the included form Lobbying Certification, add Standard Form–LLL, "Disclosure Form to Report Lobbying," if applicable.

CER 8.6 Certificate of Compliance with Bus Testing Requirement

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with 49 USC § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 according to the indicated one of the following three alternatives.

Mark one and only one of the three blank spaces with an "X."

1. _____ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on _____ (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Proposal. If the configuration or components are not identical, then the manufacturer shall provide with its Proposal a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.

2. _____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Proposal the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

3. _____ The vehicle is a new model and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

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

Company name:

Name and title of the Proposer's authorized official:

_____

Authorized signature Date

CER 8.7 DBE Approval Certification

I hereby certify that the Proposer has complied with the requirements of 49 CFR 26, Participation by Disadvantaged Business Enterprises in DOT Programs, and that its goals have not been disapproved by the Federal Transit Administration.

Name and title of the Proposer's authorized official:

_____

Authorized signature Date

CER 8.8 Federal Motor Vehicle Safety Standards

The Proposer and (if selected) Contractor shall submit (1) manufacturer's FMVSS self-certification sticker information that the vehicle complies with relevant FMVSS or (2) manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

Company name:

Name of signer:

Title:

_____

Authorized signature Date

CER 9. Other Certifications

CER 9.1 Proposal Form

Proposer shall complete the following form and include it in the price Proposal.

PROPOSAL

By execution below by a duly authorized representative(s) of the Proposer, the Proposer hereby offers to furnish equipment and services as specified in its Proposal submitted to Pinellas Suncoast Transit Authority in response to Request for Proposal No. 21-980369 Electric Transit Buses with Charging and Associated Equipment

Proposer: _____

Street address: _____

City, state, ZIP: _____

Name and title of Authorized Signer(s): _____

Name and title of Authorized Signer(s): _____

Phone: _____

_____

Authorized signature Date

_____

Authorized signature Date

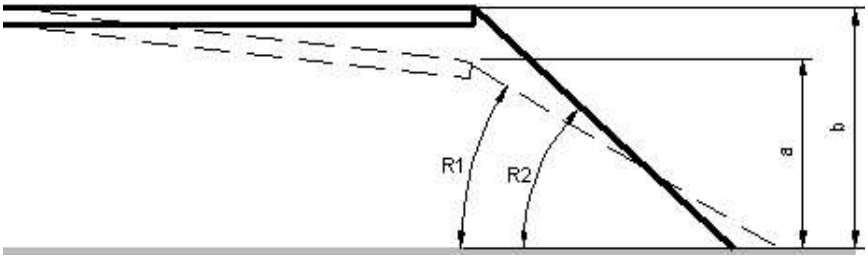
CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in response to this RFP

GENERAL COACH DATA SHEET						
Bus manufacturer:						
Bus model:						
Understructure manufacturer:						
Model number:						
Size/Type of Bus						
Basic Body Construction						
Type:						
Tubing or frame member thickness and dimensions						
Overstructure						
Understructure						
Skin thickness and material						
Roof						
Sidewall						
Skirt panel						
Front end						
Rear end						
Dimensions						
Overall length	Over bumpers		ft		in.	
	Over body		ft		in.	
Overall width	Over body excluding mirrors		ft		in.	
	Over body including mirrors–driving position		ft		in.	
	Over tires front axles		ft		in.	
	Over tires center axle		ft		in.	
	Over tires rear axles		ft		in.	
Overall height (maximum)			ft		in.	
Overall height (main roof line)			ft		in.	
Angle of approach		deg				
Breakover angle		deg				
Breakover angle (rear)		deg				
Angle of departure		deg				

Doorway Dimensions	Front		Rear	
Width between door posts		in.		in.
Door width between panels		in.		in.
Clear door width		in.		in.
Doorway height		in.		in.
Knuckle clearance		in.		in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.		in.	R1		deg	a.		in.
Unkneeled	b.		in.	R2		deg	b.		in.

Interior head room (center of aisle)

Front axle location		in.
Center axle location		in.
Rear axle location		in.

Aisle width between transverse seats		in.

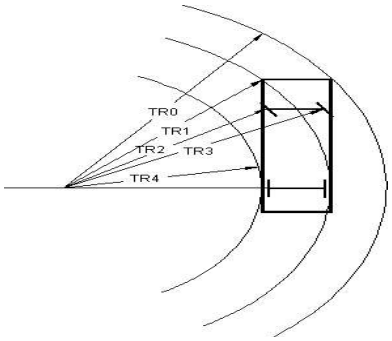
Floor height above ground (centerline of bus)

At front door		in.
At front axle		in.
At drive axle		in.
At rear door		in.

Minimum ground clearance (between bus and ground, with bus unkneeled)

Excluding axles		in.
Including axles		in.

Horizontal turning envelope (see diagram below)				
Outside body turning radius, TR0 (including bumper)		ft		in.
Front inner corner radius, TR1		ft		in.
Front wheel inner turning radius, TR2		ft		in.
Front wheel outer turning radius, TR3		ft		in.
Inside Body Turning Radius innermost point, TR4 (including bumper)		ft		in.



Wheel base		
Front		in.
Rear		in.

Overhang, centerline of axle over bumper		
Front		in.
Rear		in.

Floor				
Interior length		ft		in.
Interior width (excluding coving)		ft		in.
Total standee area (approximately)		sq ft		
Minimum distance between wheelhouses:	Front			in.
	Rear			in.
	Center			in.
Maximum interior floor slope (from horizontal)		deg		

Passenger capacity provided		
Total maximum seating		
Standee capacity		
Minimum hip to knee room		in.
Minimum foot room		in.

Weight

	No. of people	**Front axle**			**Center axle**			**Rear axle**			**Total bus**
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox											
Fully seated, full fuel and farebox											
Fully loaded standee and fully seated, full fuel and farebox											
Crush load (1.5x fully loaded)											
GVWR											
GAWR											

Energy Storage

Batteries – low voltage

Manufacturer		
Type		
Model number		
Cold Cranking Amps		Amps

Cranking Amps		Amps
Reserve Capacity		Amps

Batteries – high voltage

Manufacturer	
Type	
Model Number	
Total Battery Capacity (kWh)	
Standard Charge Time	
Charging Capacity	
Operating Temperature Range	
Cooling/Heating System	

Performance

Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)		kWh
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)		MPGE
Max Gradeability		%
Top Speed		MPH
Battery Range		Miles
Acceleration (20 MPH)		Seconds
Acceleration (40 MPH)		Seconds
Top Speed (stated above)		Seconds

Performance information/graphs to be attached with this form:

Energy consumption vs. Vehicle speed

Vehicle speed vs. time (both loaded and unloaded)

Vehicle speed vs. grade (both loaded and unloaded)

Acceleration vs. time

Change of acceleration vs. time

Traction Motor/Drive Motor

Manufacturer					
Type					
Speeds					
Traction motor horsepower rating					
Type ventilation/cooling					
Gear ratios	Forward:		Reverse:		

Voltage Equalizer	
Manufacturer	
Model	

Auxiliary Inverter (120/240)	
Manufacturer	
Model	
Inverter Technology	
Output Voltage	

Traction/Drive Motor			
Manufacturer			
Type			
Model			
Quantity			
Torque Rating			
kWh Rating			
Air compressor			
Manufacturer			
Type			
Rated capacity			CFM
Capacity at idle (approximately)			CFM
Capacity at maximum speed (engine)			CFM
Maximum warranted speed			rpm
Speed idle			rpm
Drive type			
Governor:			
Cut-in pressure			psi
Cut-out pressure			psi
Axles			
First			
Manufacturer			
Type			
Model number			
Gross axle weight rating			lb
Axle load			lb
Second			
Manufacturer			
Type			
Model number			
Gross axle weight rating			lb
Axle load			lb
Third			
Manufacturer			
Type			
Model number			
Gross axle weight rating			lb

Axle load		lb	
Axle ratio			
Suspension system			
Manufacturer			
Type:	First:		
	Second:		
	Third:		
Springs:	First:		
	Second:		
	Third:		
Joint			
Manufacturer			
Type			
Model number			
Wheels and tires			
Wheels			
Make			
Size			
Capacity			
Material			
Tires			
Manufacturer			
Type			
Size			
Load range/air pressure		psi	
Steering, power			
Pump			
Manufacturer and model number			
Type			
Relief pressure		psi	
Booster/gear box			
Manufacturer and model number			
Type			
Ratio			
Power steering fluid capacity		gal	
Maximum effort at steering wheel		lb (unloaded stationary coach on dry asphalt pavement)	
Steering wheel diameter		in.	

Brakes			
Make of fundamental brake system			
Brake chambers vendor size and part number:		First:	
		Second:	
		Third:	
Brake operation effort			
Slack adjuster's vendor's type and part numbers			
First:	Right:		
	Left:		
Second:	Right:		
	Left:		
Third:	Right:		
	Left:		
Length:	First take-up:		
	Second take-up:		
	Third take-up:		
Brake _____Drums _____Discs (Place X denoting type)			
First:	Manufacturer		
	Part number		
	Diameter		in.
Second:	Manufacturer		
	Part number		
	Diameter		in.
Third:	Manufacturer		
	Part number		
	Diameter		in.
Brake lining/pad manufacturer			
Type			
Brake lining/pad identification			
First:	Forward		
	Reverse		
Second:	Forward		
	Reverse		
Third:	Forward		
	Reverse		
Brake linings per shoe			

First		
Second		
Third		
Brake lining widths		
First		in.
Second		in.
Third		in.
Brake lining/pad lengths		
First		in.
Second		in.
Third		in.
Brake lining thickness/pad		in.
Brake lining/pad per axle		
First		sq. in.
Second		sq. in.
Third		sq. in.

Cooling system

Radiator				
Manufacturer				
Type				
Model number				
Number of tubes				
Tubes outer diameter		in./		in.
Fins per inch		fins		
Fin thickness		in.		
Total cooling and heating system capacity			gal	
Radiator fan speed control				
Surge tank capacity		qt		
Thermostat temperature setting:	Initial opening (fully closed)		°F	
	Fully open		°F	
Overheat alarm temperature sending unit setting		°F		
Shutdown temperature setting		°F		

Air reservoir capacity

Supply reservoir		cu in.
Primary reservoir		cu in.
Secondary reservoir		cu in.

Packing reservoir		cu in.
Accessory reservoir		cu in.
Other reservoir type		cu in.

Heating, ventilation and air conditioning equipment

Heating system capacity		BTU/hr
Air conditioning capacity		BTU
Ventilating capacity		CFM

Compressor

Manufacturer					
Model					
Number of cylinders					
Drive ratio					
Maximum warranted speed				rpm	
Operating speed				rpm (recommended)	
Weight				lb	
Oil capacity	Dry		gal		
	Wet		gal		
Refrigerant:	Type				lb

Condenser

Manufacturer		
Model		
Number of fins/in.		
Outer diameter of tube		in.
Fin thickness		in.

Condenser fan

Manufacturer		
Model		
Fan diameter		in.
Speed maximum		rpm
Flow rate (maximum)		CFM

Receiver

Manufacturer		
Model		
Capacity		lb

Condenser fan drive motors

Manufacturer	

Model		
Type		
Horsepower		hp
Operating speed		rpm
Evaporator fan drive motors		
Manufacturer		
Model		
Type		
Horsepower		hp
Operating speed		rpm
Evaporator(s)		
Manufacturer		
Model		
Number of rows		
Number of fins/in.		
Outer diameter of tube		in.
Fin thickness		in.
Number of evaporators		
Expansion valve		
Manufacturer		
Model		
Filter-drier		
Manufacturer		
Model		
Heater cores		
Manufacturer		
Model		
Capacity		Btu/hr
Number of rows		
Number of fins/in.		
Outer diameter of tube		in.
Fin thickness		in.
Number of heater cores		
Floor heater blowers		
Front		
Rear		

Controls			
Manufacturer			
Model			
Driver's heater			
Manufacturer			
Model			
Capacity		Btu/hr	
Ventilation system			
Type			
Coolant heater			
Make			
Model			
Capacity		Btu	
Interior lighting			
Manufacturer			
Type			
Number of fixtures			
Size of fixtures			
Power pack			
Doors			
Front			
Manufacturer of operating equipment			
Type of door			
Type of operating equipment			
Rear			
Manufacturer of operating equipment			
Type of door			
Type of operating equipment			
Passenger windows			
Front			
Manufacturer			
Model			
Type			
Number:	Side		

	Rear				
Sizes:					
Glazing:	Type				
	Thickness				
	Color of tint				
	Light transmission				

Mirrors

	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior					
Left side exterior					
Center rearview					
Front entrance area					
Upper-right corner					
Rear exit area					

Seats

Passenger	
Manufacturer	
Model	
Type	

Operator	
Manufacturer	
Model and part number	
Type	

Paint

Manufacturer	
Type	

Wheelchair ramp equipment

Manufacturer		
Model number		
Capacity		lb
Width of platform		in.
Length of platform		in.
System fluid capacity		qt
Type of fluid used		
Operating hydraulic pressure		psi
Hydraulic cylinders:	Size	

	Number		

Wheelchair securement equipment

Manufacturer	
Model number	

Destination signs

Manufacturer	
Type	

Character length		
Front destination		in.
Front route		in.
Curbside destination		in.
Rear route		in.
Character height		
Front destination		in.
Front route		in.
Curbside destination		in.
Rear route		in.
Number of characters		
Front destination		
Front route		
Curbside destination		
Rear route		
Message width		
Front destination		in.
Front route		in.
Curbside destination		in.
Rear route		in.

Electrical

Multiplex system	
Manufacturer	
Model number	
Batteries	
Manufacturer	
Model number	

Type	

Communication system

GPS	
Manufacturer	
Model number	

PA system

	Manufacturer	Model number	Number
Amplifier			
Microphone			
Internal speakers			
External speaker			

Energy storage

Type		
Number of cells		V
Battery pack voltage		V
Weight		lb

Security camera system

Manufacturer		
Model number		
Number of cameras		
Storage capacity		

Bike racks

Manufacturer	
Model number	

Fire detection system

Manufacturer		
Model number		
Fire detectors		
Type (thermal or optical)		
Number of detectors		

Automatic voice annunciator system

Manufacturer	
Model and part number	

Annunciator LED sign		
Number of signs		
Housing dimensions		
Character length		in.
Character height		in.
Character width		in.
GPS antenna		
Manufacturer		
Model and part number		
Automatic passenger counter		
Manufacturer		
Model and part number	a.	
	b.	
	c.	
Sensor type		

Real-time bus arrival prediction system

	Manufacturer	Model number
Router		
Cellular modem		
Charge protection		

NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.

SECTION 10: CONTRACT

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)
ST. PETERSBURG, FLORIDA

ADDENDUM OF SOLICITATION

1. SOLICITATION NO.:	2. ADDENDUM NO.:	3. EFFECTIVE DATE:	4. BRIEF SOLICITATION DESCRIPTION:
RFP 21-980369	1	07/29/2021	FLORIDA ELECTRIC TRANSIT BUSES

5. REVISED OFFER SUBMISSION DUE DATE AND TIME:
(*Note: Unless identified below, this solicitation Addendum does not change the Offer Submission Date and Time.)*

The date and/or time specified for receipt of offers is changed as follows:

DATE:

TIME: AM/PM Local

6. REVISED PRE-BID/PROPOSAL CONFERENCE:
(Note: Unless identified below, this solicitation Addendum does not change the Pre-Bid/Proposal Conference, if a conference is scheduled.)

The scheduled pre-bid/proposal conference is changed as follows:

DATE:

TIME: AM/PM Local

LOCATION:

7. ADDENDUM OF SOLICITATION:
The Solicitation identified in Block 1, above, is hereby amended as described in Block 11, below. Except as provided herein, all other provisions of the solicitation, or as heretofore amended, remain unchanged and in full force and effect.

8. REQUIREMENT TO ACKNOWLEDGE ADDENDUM:
Offerors must acknowledge receipt of this Addendum prior to the deadline specified in the solicitation for receipt of offers by the following method:

a. Shall acknowledge the receipt of each individual addendum in their Proposals on the form Acknowledgement of Addenda.

WARNING: Failure of an Offeror to acknowledge receipt of this Addendum, as described herein, may result in REJECTION OF THE OFFER.

***NOTE**: For Invitations for Bids the terms "Offer" and Offeror" shall mean "Bid" and "Bidder", respectively; and for Requests for Proposals or Quotation the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.*

9. FOR FURTHER INFORMATION CALL CONTRACTS SPECIALIST:

Name: Alvin Burns **Email:** aburns@psta.net

10. DESCRIPTION OF ADDENDUM:

1. **Please see the attached list for all questions and the Authority's responses**
2. **Attachment - Electric Transit Buses with Charging and Associated Equipment Contract**
3. **The following Clause has been incorporated into the solicitation in section 5 Federal Requirements**:

FR18

Disputes, Breaches, Defaults, and Litigation.

(b) Notification to FTA; Flow Down Requirement. If a current or prospective legal matter that may affect the Federal Government emerges, the Recipient must promptly notify the FTA Chief Counsel and FTA Regional Counsel for the Region in which the Recipient is located. The Recipient must include a similar notification requirement in its Third Party Agreements and must require each Third Party Participant to include an equivalent provision in its subagreements at every tier, for any agreement that is a "covered transaction" according to 2 C.F.R. §§ 180.220 and 1200.220.

(3) Additional Notice to U.S. DOT Inspector General. 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, if the Recipient has knowledge of potential fraud, waste, or abuse occurring on a Project receiving assistance from FTA. The notification provision applies if a person has or may have submitted a false claim under the False Claims Act, 31 U.S.C. § 3729, et seq., or has or may have committed a criminal or civil violation of law pertaining to such matters as fraud, conflict of interest, bid rigging, misappropriation or embezzlement, bribery, gratuity, or similar misconduct involving federal assistance. This responsibility occurs whether the Project is subject to this Agreement or another agreement between the Recipient and FTA, or an agreement involving a principal, officer, employee, agent, or Third Party Participant of the Recipient. It also applies to subcontractors at any tier. Knowledge, as used in this

paragraph, includes, but is not limited to, knowledge of a criminal or civil investigation by a Federal, state, or local law enforcement or other investigative agency, a criminal indictment or civil complaint, or probable cause that could support a criminal indictment, or any other credible information in the possession of the Recipient. In this paragraph, “promptly” means to refer information without delay and without change. This notification provision applies to all divisions of the Recipient, including divisions tasked with law enforcement or investigatory functions.

	Amendment	VENDOR QUESTION	PSTA RESPONSE
1	1	Will this procurement cover the design & installation of chargers?	No
2	1	Can you confirm if charger design and installation is being requested from this RFP?	No
3	1	As seen in section TS 19. Altoona Testing, it states "*Buses which have not successfully completed an Altoona Test for the type and sizes requested under this RFP will not be considered.*" Please confirm if a proposal will be considered if Altoona testing is to be completed after the proposal submission, and tests from our current similar models are provided in our proposal.	The bus will need to satifsy meeting FTA Pre Award, Post delivery and FAST Act requirements.
4	1	Will the agency allow the submission of question using an excel spreadsheet instead of using CER 2. Request for Pre-Offer Change or Approved Equal, which can facilitate response. Please advise.	Yes

AGREEMENT FOR ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

THIS AGREEMENT for ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT ("Agreement") is made on_____, 2021, by and between the Pinellas Suncoast Transit Authority ("PSTA"), an independent special district with its principal place of business located at 3201 Scherer Drive, St. Petersburg, Florida, 33716 and_____("Contractor"), a_____with its principal place of business located at_____(collectively, the "Parties").

WHEREAS, PSTA issued RFP 21-980369 for Electric Transit Buses with Charging and Associated Equipment on July 14, 2021 (the "RFP"); and

WHEREAS, Contractor timely submitted its response to the RFP on or before September 14, 2021 ("Contractor's Response"); and

WHEREAS, PSTA's Board of Directors awarded the contract to Contractor at its duly held Board of Directors meeting on_____, 2021 (the "Effective Date").

NOW, THEREFORE, in consideration of the mutual promises and agreements set forth herein, and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, the Parties agree as follows:

1. RECITALS. The above recitals are true and correct and incorporated herein by reference.

2. CONTRACT DOCUMENTS. The "Contract Documents" shall mean and refer to this Agreement, the RFP including all exhibits attached thereto including any and all duly executed and issued addenda (attached hereto as **Exhibit 1**), any and all Purchase Orders (as defined below and attached as composite **Exhibit 2**), Contractor's Best and Final Offer (BAFO), if any (attached hereto as **Exhibit 3**), and Contractor's Response (attached hereto as **Exhibit 4**). All of the foregoing are incorporated herein by reference and are made a part of this Agreement. In interpreting this Agreement and resolving any ambiguities or conflicts between this Agreement and the exhibits, this Agreement takes precedence over the exhibits and any inconsistency between the exhibits will be resolved in the following order:

Exhibit 1	RFP
Exhibit 2	Purchase Order(s)
Exhibit 3	Contractor's BAFO
Exhibit 4	Contractor's Response

3. SCOPE OF SERVICES. Contractor, at the direction of PSTA, shall furnish to PSTA Electric Transit Buses with Charging and Associated Equipment as described in, and in accordance with the specifications, tasks, and scope of work set forth in the RFP (the "Services"), and in the amount set forth in the RFP. Contractor acknowledges that it has read the specifications and understands them. Contractor also agrees to provide electric transit buses with charging and associated equipment to all permissible assignees of PSTA. PSTA's permissible assignees shall have the option to purchase electric transit buses and charging and associated equipment in accordance with the terms and conditions of the RFP, and specifically SP 3of the RFP.

4. EFFECTIVE DATE AND TERM OF AGREEMENT. This Agreement shall become effective and commence on the Effective Date and shall remain in effect for five (5) years.

5. TERMS OF PERFORMANCE.

5.01. Time for Completion/Purchase Orders. PSTA will issue purchase orders for the electric buses with charging and associated equipment it needs provided under this Agreement ("Purchase Order(s)"). Upon issuance, the Purchase Order shall be appended to this Agreement and incorporated as an exhibit, Contractor shall immediately begin providing the Services pursuant to the Purchase Order, and all work and deliverables shall be completed by the date set forth in the Purchase Order, unless modified in writing by the Parties. In the event a Purchase Order approved during the term of the Contract Term has a completion date beyond the Contract Term, the terms and conditions of this Agreement shall be automatically extended through the completion of the Purchase Order to the full satisfaction of PSTA.

5.02. Representatives. Prior to the start of any ordering or supplying the Services under this Agreement, Contractor shall designate a primary and alternate representative, who will have management responsibility for the Services and who will have authority to act on technical matters and resolve problems with the Services, Purchase Order(s), and the Contract Documents, to PSTA in writing. Such designation shall include the contact information (including phone numbers) of Contractor's representative. PSTA will advise Contractor in writing of the personnel who will represent PSTA in the administration of the Contract Documents. Such writing from PSTA may include the specific duties of each individual and each representative's limits of authority.

5.03. Non-exclusive Contract. PSTA specifically reserves the right to contract with other entities for the Services described in the Contract Documents or for similar products if it deems, in its sole discretion, such action to be in PSTA's best interest.

5.04. Contractor Responsibility. Contractor shall provide electric buses with charging and associated equipment of first quality, and the workmanship must be in accordance with customary standards of the various trades and industries involved in the manufacturing and furnishing of such products. The Servicesand the work associated therewith shall be of high-quality in all respects. No advantage will be taken by Contractor in the omission of any part or detail of the Services. Contractor hereby assumes responsibilityfor all materials, equipment, and processes used in the manufacturing and furnishing of the electric busesand charging and associated equipment, whether the same is manufactured by Contractor or purchased readymade from a source outside Contractor's company.

5.05. Compliance with Laws. Contractor shall comply with all federal, state, county, and local laws, rules and/or regulations, and lawful orders of public authorities including those set forth in this Agreement and that, in any manner, could bear on the provision of the Services under the Contract Documents. Omission of any applicable laws, ordinances, rules, regulations, standards or orders by PSTA in the Contract Documents shall be construed as an oversight and shall not relieve Contractor of its obligations to comply with such laws fully and completely. Upon request, Contractor shall furnish to PSTA certificates of compliance with all such laws, orders and regulations. Contractor shall be responsible for obtaining all necessary permits and licenses required for performance under this Agreement.

6. COMPENSATION. In consideration of Contractor's faithful performance of the Contract Documents, PSTA agrees to pay Contractor pursuant to the rates and pricing set forth in Contractor's Response or Contractor's BAFO, if any. However, all payments to Contractor individually and in the aggregate shall not exceed the Contract Total. Payment shall be made in accordance with the RFP and the Florida Prompt Payment Act, section 218.70, *et seq.*, Florida Statutes.

6.01. Invoices. All invoices shall be submitted in accordance with the Florida Prompt Payment Act, section 218.72, et seq., Florida Statutes, with all details prescribed by PSTA, and delivered to the following address:

Pinellas Suncoast Transit Authority
Attention: Finance Department/Accounts Payable
Purchase Order or Contract #: _____
3201 Scherer Drive
St. Petersburg, Florida 33716

or via electronic mail to:
AccountsPayable@psta.net

6.02. *Disputed Invoices.* In the event of a disputed invoice, only that portion so contested may be withheld from payment and the undisputed portion shall be due and payable on the terms set forth herein.

6.03. *Availability of Funds*. Contractor understands that the funds are not presently available under this Agreement beyond the current fiscal year. PSTA's obligation for performance under this Agreement beyond the current fiscal year is contingent upon the availability of funds from which payments can be made. PSTA is not legally liable for any payment that may arise under this Agreement beyond the current fiscal year, until the Contractor receives a written notice of availability of funds from the PSTA's Contracting Officer.

7. WARRANTIES AND COVENANTS.

7.01. *Patent, Trademark, Copyright, and Trade Secret.* Contractor warrants that the Services, and all goods and work associated therewith, do not infringe on any patent, trademark, copyright or trade secret of anythird parties and agrees to defend, indemnify and hold PSTA, its officers, agents, employees, trustees andits successors and assigns, harmless from and against any and all liabilities, loss, damage or expense, including, without limitation, court costs and reasonable attorneys' fees, arising out of any infringement or claims of infringement of any patent, trade name, trademark, copyright or trade secret by reason of the sale or use of any goods or services purchased under this Agreement. PSTA shall promptly notify Contractor of any such claim. PSTA makes no warranty that the production, sale or use of goods or services under this Agreement will not give rise to any such claim and PSTA shall not be liable to Contractor for any such claim brought against Contractor. If any invention, improvement, or discovery of the Contractor is conceived or first actually reduced to practice in the course of providing the Services under this Agreement, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the Contractor agrees to notify the PSTA immediately and provide a detailed report. The rights and responsibilities of the Contractor and PSTA with respect to such invention, improvement, or discovery will be determined in accordance with applicable Federal laws, regulations, policies, and any waiver thereof.

7.02. *Covenants against Gratuities.* Contractor warrants that he or she has not offered or given gratuities (in the form of entertainment, gifts, or otherwise) to any official or employee of PSTA with a view toward securing favorable treatment in the awarding, amending, or evaluating performance of this Agreement.

7.03. *E-Verify.* Contractor shall utilize the U.S. Department of Homeland Security's E-Verify System to verify the employment eligibility of: (a) all persons employed by Contractor throughout the term of this Agreement; and (b) all persons, including subcontractors, retained or hired by Contractor, regardless of compensation, to perform work on the Services provided pursuant to the Contract Documents.

8. DELAY IN PERFORMANCE/FORCE MAJEURE.

8.01. *Time of the Essence.* The timely receipt of the Services and deliverables to PSTA is essential. If the Services and all deliverables under each Purchase Order are not received by PSTA within the date specified in each Purchase Order, PSTA may cancel the unfilled portion of the Purchase Order and this

Agreement for cause, purchase substitutes elsewhere, and recover from Contractor any increased costs and damages thereby incurred by PSTA.

8.02. Unavoidable Delay. If completion of the Services under any Purchase Order is unavoidably delayed, PSTA may, in its sole and absolute discretion, extend the time for completion for a determined number of days of excusable delay. A delay is unavoidable only if the delay was not reasonably expected to occur in connection with or during Contractor's performance; was not caused directly or substantially by negligent errors, omissions, or mistakes of Contractor, its subcontractors, or its suppliers or their agents; was substantial; and, in fact, caused Contractor to miss delivery dates and could not adequately have been guarded against by contractual or legal means.

8.03. No Damages for Delay. Contractor shall not be entitled to any claim for damages on account of hindrances or delays in the work from any cause whatsoever, including any delays or hindrances caused by PSTA. This paragraph shall include, but not be limited to, any actions which result in delays in scheduling, substantial changes in scope of the Services or deliverables or substantial increases in the costs of performing the work under the Contract Documents.

8.04. Notification. Contractor will notify PSTA as soon as Contractor has, or should have, knowledge that an event has occurred which will delay completion of the Services under a Purchase Order. Within five (5) working days, Contractor will confirm such notice in writing, furnishing as much detail as is available and including any request for extension of time. Contractor shall supply, as soon as such data is available, any reasonable proofs that are required by PSTA to make a decision on any request for extension. PSTA will examine the request and any documents supplied by Contractor and will determine if Contractor is entitled to an extension and the duration of such extension. PSTA will notify Contractor of its decision in writing. It is expressly understood and agreed that Contractor will not be entitled to any extension and the granting of such extension is in the sole discretion of PSTA. It is further expressly understood that Contractor shall not be entitled to any damages or compensation, and will not be reimbursed for anylosses, on account of delays resulting from any cause.

9. DISPUTES, BREACHES, DEFAULTS, OR OTHER LITIGATION.

9.01. Rights and Remedies. The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by PSTA or Contractor shall constitute a waiver of any right or duty afforded any of them under this Agreement, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

9.02. Attorneys' Fees. In the event of legal action or other proceeding arising under this Agreement, PSTA shall be entitled to recover from Contractor all its reasonable attorneys' fees and cost incurred by PSTA in the prosecution or defense of such action, or in any post-judgment or collection proceedings and whether incurred before suit, at the trial level or at the appellate level. This shall include any bankruptcy proceedings filed by or against Contractor. PSTA also shall be entitled to recover any reasonable attorneys' fees and costs incurred in litigating the entitlement to attorneys' fees and costs, as well as in determining the amount of attorneys' fees and costs due to PSTA. The reasonable costs to which PSTA will be entitled include costs that are taxable under any applicable statute, rule, or guideline, as well as costs of investigation, copying costs, electronic discovery costs, mailing and delivery charges, costs of conducting legal research, consultant and expert witness fees, travel expenses, court reporter fees and mediator fees, regardless of whether such costs are taxable under any applicable statue, rule or guideline.

10. INDEMNIFICATION.

10.01 Indemnification. The Parties recognize that Contractor is an independent contractor. Contractor

agrees to assume liability for and indemnify, hold harmless, and defend PSTA, its board members, officers, employees, agents and attorneys, of, from, and against all liability and expense, including reasonable attorneys' fees, in connection with any and all claims, demands, damages, actions, causes of action, and suits in equity of whatever kind or nature, including claims for personal injury, property damage, equitable relief, or loss of use, arising out of the execution, performance, nonperformance, or enforcement of this Agreement, whether or not due to or caused by the negligence of PSTA, its board members, officers, employees, agents, and/or attorneys excluding only the sole negligence of PSTA, its officers, employees, agents, and attorneys. This includes claims made by the employees of Contractor against PSTA, and Contractor hereby waives its entitlement, if any, to immunity under Section 440.11, Florida Statutes. Contractor's liability hereunder shall include all attorneys' fees and costs incurred by PSTA in the enforcement of this indemnification provision. Notwithstanding anything contained herein to the contrary, this indemnification provision shall not be construed as a waiver of any immunity from or limitation of liability to which PSTA is entitled to pursuant to the doctrine of sovereign immunity or Section 768.28, Florida Statutes. The obligations contained in this provision shall survive termination of this Agreement, however terminated, and shall not be limited by the amount of any insurance required to be obtained or maintained under this Agreement.

10.02 Control of Defense. Subject to the limitations set forth in this provision, Contractor shall assume control of the defense of any claim asserted by a third party against PSTA arising from or in any way related to this Agreement and, in connection with such defenses, shall appoint lead counsel, in each case at Contractor's expense. Contractor shall have the right, at its option, to participate in the defense of any third party claim, without relieving Contractor of any of its obligations hereunder. If Contractor assumes control of the defense of any third party claim in accordance with this paragraph,Contractor shall obtain the prior written consent of PSTA before entering into any settlement of suchclaim. Notwithstanding anything to the contrary in this provision, Contractor shall not assume or maintain control of the defense of any third party claim, but shall pay the fees of counsel retained byPSTA and all expenses including experts' fees, if (i) an adverse determination with respect to the thirdparty claim would, in the good faith judgment of PSTA, be detrimental in any material respect of PSTA's reputation; (ii) the third party claim seeks an injunction or equitable relief against PSTA; or (iii) Contractor has failed or is failing to prosecute or defend vigorously the third party claim. Each party shall cooperate, and cause its agents to cooperate, in the defense or prosecution of any third party claim and shall furnish or cause to be furnished such records and information, and attend such conferences, discovery proceedings, hearings, trials, or appeals, as may be reasonably requested in connection therewith.

11. MISCELLANEOUS PROVISIONS.

11.01 Entire Agreement. The Contract Documents, including all exhibits, constitute the entire agreement between the parties with respect to the subject matter hereof and supersedes all previous written or oral negotiations, agreements, proposals and/or understandings. There are no representations or warranties unless set forth in the Contract Documents.

11.02 Notices. All notices required or made pursuant to this Agreement shall be made in writing and sent by certified U.S. mail, return receipt requested, addressed to the following:

To PSTA:
Pinellas Suncoast Transit Authority
Attn: Brad Miller, CEO
3201 Scherer Drive
St. Petersburg, FL 33716

To Contractor:
_____
_____
_____
_____

With required copy to:

Alan S. Zimmet, B.C.S.
Bryant Miller Olive
One Tampa City Center
Suite 2700
Tampa, FL. 33602

Either party may change its above noted address by giving written notice to the other party in accordance with the requirements of this section.

11.03 *Waiver of Remedies for any Breach*. In the event that PSTA elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Agreement, such waiver by PSTA shall only be valid if set forth in writing and shall not limit PSTA's remedies for any succeeding breach of that or of any other term, covenant, or condition of this Agreement.

11.04 *Modification.* The Contract Documents, including the scope, specification, and details of the Services may only be modified by written agreement of the Parties. No modification shall serve to increase the Contract Total unless such change has been approved by PSTA's Board of Directors prior to anywork being performed that would serve to increase the Contract Total.

11.05 *Headings and Section References.* The headings and section references in this Agreement are inserted only for the purpose of convenience and shall not be construed to expand or limit the provisions contained in such sections.

11.06 *Authorization.* Both parties to this Agreement represent and warrant that they are authorized to enter into this Agreement without the consent and joinder of any other party and that the parties executing this Agreement have full power and authority to bind their respective parties to the terms hereof.

11.07 *Assignment*. The terms and provisions of this Agreement shall be binding upon the Parties and their respective partners, successors, heirs, executors, administrators, assigns and legal representatives. Notwithstanding the foregoing, a party's rights and obligations under this Agreement may only be transferred, assigned, sublet, mortgaged, pledged or otherwise disposed of or encumbered in any way with the other party's prior written consent.

11.08 *Severability*. If any one or more provisions of this Agreement shall be held to be invalid, illegal, or unenforceable in any respect by a court of competent jurisdiction, the validity, legality, and enforceability of the remaining provisions hereof shall not in any way be affected or impaired thereby and this Agreement shall be treated as though the invalidated portion(s) had never been a part hereof.

11.09 *Electronic Signatures*. This Agreement may be executed by electronic signature technology and such electronic signature shall act as the Parties' legal signatures on this Agreement and shall be treated in all respects as an original handwritten signature.

11.10 *Counterparts*. This Agreement may be executed in one or more counterparts, any one of which need not contain the signatures of more than one party, but all such counterparts taken together will constitute one and the same instrument.

(SIGNATURES ON FOLLOWING PAGE)

IN WITNESS WHEREOF the Parties hereto have caused this Agreement to be duly executed on the date first above written.

CONTRACTOR:

By:_____

_____
Print Name:

Title:

PSTA:

By: _____
Brad Miller, CEO

Attest:

_____
Rachael Cappolla, Executive Assistant

WITNESS/ATTEST:

By:_____
Print Name:_____

Approved as to form:

By: _____
Alan S. Zimmet, General Counsel

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)
ST. PETERSBURG, FLORIDA

ADDENDUM OF SOLICITATION

1. SOLICITATION NO.:	2. ADDENDUM NO.:	3. EFFECTIVE DATE:	4. BRIEF SOLICITATION DESCRIPTION:
RFP 21-980369	2	August 5, 2021	FLORIDA ELECTRIC TRANSIT BUSES

5. REVISED OFFER SUBMISSION DUE DATE AND TIME:
(*Note: Unless identified below, this solicitation Addendum does not change the Offer Submission Date and Time.)*

The date and/or time specified for receipt of offers is changed as follows:

DATE:

TIME: AM/PM Local

6. REVISED PRE-BID/PROPOSAL CONFERENCE:
(Note: Unless identified below, this solicitation Addendum does not change the Pre-Bid/Proposal Conference, if a conference is scheduled.)

The scheduled pre-bid/proposal conference is changed as follows:

DATE:

TIME: AM/PM Local

LOCATION:

7. ADDENDUM OF SOLICITATION:
The Solicitation identified in Block 1, above, is hereby amended as described in Block 11, below. Except as provided herein, all other provisions of the solicitation, or as heretofore amended, remain unchanged and in full force and effect.

8. REQUIREMENT TO ACKNOWLEDGE ADDENDUM:
Offerors must acknowledge receipt of this Addendum prior to the deadline specified in the solicitation for receipt of offers by one of the following methods:

a. Shall acknowledge the receipt of each individual addendum in their Proposals on the form Acknowledgement of Addenda.

WARNING: Failure of an Offeror to acknowledge receipt of this Addendum, as described herein, may result in REJECTION OF THE OFFER.

***NOTE**: For Invitations for Bids the terms "Offer" and Offeror" shall mean "Bid" and "Bidder", respectively; and for Requests for Proposals or Quotation the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.*

9. FOR FURTHER INFORMATION CALL CONTRACTS SPECIALIST:

Name: Alvin Burns **Email:** aburns@psta.net **(cc:** erandle@psta.net**)**

10. DESCRIPTION OF ADDENDUM:

1. Vendor questions and the Authority's Responses.
2. Request for Pre-Offer Change or Approved Equal & RFP Updates
3. Revised Excel Pricing Schedule (Attachment)

	Amendment	VENDOR QUESTION	PSTA RESPONSE
1	1	Will this procurement cover the design & installation of chargers?	No
2	1	Can you confirm if charger design and installation is being requested from this RFP?	No
3	1	As seen in section TS 19. Altoona Testing, it states "*Buses which have not successfully completed an Altoona Test for the type and sizes requested under this RFP will not be considered.*" Please confirm if a proposal will be considered if Altoona testing is to be completed after the proposal submission, and tests from our current similar models are provided in our proposal.	The bus will need to satisfy meeting FTA Pre Award, Post delivery and FAST Act requirements.
4	1	Will the agency allow the submission of question using an excel spreadsheet instead of using CER 2. Request for Pre-Offer Change or Approved Equal, which can facilitate response. Please advise.	Yes
5	2	Is there a desired kW power level for the Depot Charger ?	No
6	2	Can the Proposer submit multiple equipment model options for depot chargers ? In order to best accommodate fleet operators needs, we believe it is important to provide a larger range of chargers capable of various power levels.	Yes. As long as supporting documentation is included in your proposal
7	2	Can sequential charging be proposed, in lieu of simultaneous charging ? In many, if not most instances, sequential charging will meet the fleet's recharging needs.	Please clarify what you are define as sequential charging and simultaneous charging
8	2	Can the Proposer submit additional unit pricing options to supply charger accessories, as well as corrective and preventative maintenance plans, in addition to charger hardware supply?	Yes
9	2	In the RFP under TS 19. Altoona Testing it states the following... The vehicle must have completed any FTA-required Altoona testing. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure that any and all such failures will not occur shall be submitted to the Agency. DEFAULT An Altoona Test Report shall be provided to the Agency with the Proposal submittal. Buses which have not successfully completed an Altoona Test for the type and sizes requested under this RFP will not be considered. **The Proposer would like to confirm that an Altoona Test Report is required at time of submission?**	Please see addendum 1, question #3

Request for Pre-Offer Change or Approved Equal & RFP Updates

PSTA RFP 21-980369

Request #	Addendum	RFP Section	Page	RFP	Questions/Clarification or Approved Equal	Agency Action	Agency Response:
1	2	TS 84.1 Camera Surveillance System	179	Provide all wiring and mounting locations for a multi-camera surveillance system, including the installation of cameras, recorder, microphone, etc..	Proposer requests information on whether or not a camera system should be included in the base bus price. Currently, various information pertinent to details of this system such as supplier, number of cameras, type of DVR and functionalities are missing from the technical specifications. Such information is essential to be able to provide accurate pricing and configuration. In light of this, proposer requests approval to provide price of such systems only through optional itemsincluded in CER 6. Pricing Schedule	See Response	**DEFAULT** No camera system. **ALTERNATIVE** A camera system shall be installed. Agency to select from list of available camera systems from OEM options list including installation locations. **ALTERNATIVE** Pre-wire only. Agency may select to have vehicle pre-wired only for a camera system.
2	2	CER 6. Pricing Schedule	NA	NA	The specification of several systems such as Destination signs, Camera Systems, and Automatic Passenger Counters are missing configuration details that are essential for costing. Proposer understands that the its base bus configuration will not have any of such systems, but optional pricing for those will be provided via CER 6. Pricing Schedule for interested agencies. Please confirm our understanding.	See Addendum	Pricing Scheduled has be updated
3	2	TS 81 Destination Signs	177	A destination sign system shall be furnished on the front, on the right side near the front door. Route sign on the rear of the vehicle. All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver. The driver shall be able to access the sign while seated. The destination sign compartments shall meet the following minimum requirements: Compartments shall be designed to prevent condensation and entry of moisture and dirt. Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself. Access shall be provided to allow cleaning of inside compartment window and unit glazing. The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide. Run number sign shall be installed.	NA	RFP Update	**DEFAULT** A destination sign shall be furnished on the front and on the right side (curbside) near the front door. The destination signs shall be Luminator Smart Series III with white LED, or approved equal. **ALTERNATIVE** Agency to select from list of available destination sign systems from OEM provided options list. **ALTERNATIVE** A rear route sign, if available, shall be installed on the rear of the vehicle. **ALTERNATIVE** A run number sign, if available, shall be installed on the vehicle
4	2	TS 84.3 Automatic Passenger Counters (APC)	179	**ALTERNATIVE** An infrared APC system shall be installed. Agency to provide details of APC system, including installation locations and number of buses to be equipped.	NA	RFP Update	**DEFAULT** No automatic passenger counter system. **ALTERNATIVE** An automatic passenger counter system shall be installed. Agency to select from list of available automatic passenger counter systems from OEM options list including installation locations.
5	2	TS 84.4.2 Handset	180	Contractor will install a handset for driver use.	NA	RFP Update	**DEFAULT** No handset. **ALTERNATIVE** A handset for driver use shall be installed. Agency to select from list of available handsets including installation location from OEM option list.
6	2	TS 86. Computer Assisted Dispatching System (CAD/AVL)	181	There will be a requirement to furnish and install a complete automatic vehicle locating (AVL), computer assisted dispatching system as part of this proposal. The equipment provided and installed shall be manufactured and provided by Clever Devices. Each PSTA bus is equipped with various components provided by Clever Devices to include all necessary wiring and software installation. The on board computing processer unit- IVN4 is the central processing unit for each revenue service vehicle in the PSTA fleet. Along with the IVN4 each bus has an interactive Mobile Data Terminal (MDT) which Clever Devices references as a Transit Control Head (TCH). This equipment is interfaced with the bus radio, destination signs, and fare boxes to provide a central "Single Point Logon." All data is transmitted through a cellular network. Clever Devices also provides to PSTA an Automatic Vehicle Monitoring System (AVM-3) for each individual bus controlled by a central networking system. This interface monitors the major vehicle components and generates automatic reports through our Wireless Access Points (file dumping) and real-time monitoring via a cellular network.	NA	RFP Update	**DEFAULT** No computer assisted dispatching system (CAD/AVL). **ALTERNATIVE** A computer assisted dispatching system (CAD/AVL) shall be installed. Agency to select from list of available CAD/AVL systems from OEM options list including installation requirements and configuration. **ALTERNATIVE** Pre-wire only. Agency may select to have vehicle pre-wired only for a CAD/AVL system.

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)
ST. PETERSBURG, FLORIDA

ADDENDUM OF SOLICITATION

1. SOLICITATION NO.:	2. ADDENDUM NO.:	3. EFFECTIVE DATE:	4. BRIEF SOLICITATION DESCRIPTION:
RFP 21-980369	3	August 17, 2021	FLORIDA ELECTRIC TRANSIT BUSES

5. REVISED OFFER SUBMISSION DUE DATE AND TIME:
(*Note: Unless identified below, this solicitation Addendum does not change the Offer Submission Date and Time.)*

The date and/or time specified for receipt of offers is changed as follows:

DATE:
TIME: AM/PM Local

6. REVISED PRE-BID/PROPOSAL CONFERENCE:
(Note: Unless identified below, this solicitation Addendum does not change the Pre-Bid/Proposal Conference, if a conference is scheduled.)

The scheduled pre-bid/proposal conference is changed as follows:

DATE:
TIME: AM/PM Local
LOCATION:

7. ADDENDUM OF SOLICITATION:
The Solicitation identified in Block 1, above, is hereby amended as described in Block 11, below. Except as provided herein, all other provisions of the solicitation, or as heretofore amended, remain unchanged and in full force and effect.

8. REQUIREMENT TO ACKNOWLEDGE ADDENDUM:
Offerors must acknowledge receipt of this Addendum prior to the deadline specified in the solicitation for receipt of offers by one of the following methods:

a. Shall acknowledge the receipt of each individual addendum in their Proposals on the form Acknowledgement of Addenda.

WARNING: Failure of an Offeror to acknowledge receipt of this Addendum, as described herein, may result in REJECTION OF THE OFFER.

***NOTE**: For Invitations for Bids the terms "Offer" and Offeror" shall mean "Bid" and "Bidder", respectively; and for Requests for Proposals or Quotation the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.*

9. FOR FURTHER INFORMATION CALL CONTRACTS SPECIALIST:

Name: Alvin Burns **Email:** aburns@psta.net **(cc:** erandle@psta.net**)**

10. DESCRIPTION OF ADDENDUM:

1. Request for Pre-Offer Change or Approved Equal & RFP Updates
2. Revised Table 1 - Contract Deliverables

Request for Pre-Offer Change or Approved Equal & RFP Updates
PSTA RFP 21-980369

Request #	Addendum	RFP Section	Page	RFP	Questions/Clarification or Approved Equal	Agency Action	Agency response:
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2	2	CER 6. Pricing Schedule	NA	NA	The specification of several systems such as Destination signs, Camera Systems, and Automatic Passenger Counters are missing configuration details that are essential for costing. Proposer understands that the its base bus configuration will not have any of such systems, but optional pricing for those will be provided via CER 6. Pricing Schedule for interested agencies. Please confirm our understanding.	See Addendum	Pricing Scheduled has be updated
3	2	TS 81 Destination Signs	177	A destination sign system shall be furnished on the front, on the right side near the front door. Route sign on the rear of the vehicle. All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver. The driver shall be able to access the sign while seated. The destination sign compartments shall meet the following minimum requirements: Compartments shall be designed to prevent condensation and entry of moisture and dirt. Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself. Access shall be provided to allow cleaning of inside compartment window and unit glazing. The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide. Run number sign shall be installed.	NA	RFP Update	**DEFAULT** A destination sign shall be furnished on the front and on the right side (curbside) near the front door. The destination signs shall be Luminator Smart Series III with white LED, or approved equal. **ALTERNATIVE** Agency to select from list of available destination sign systems from OEM provided options list. **ALTERNATIVE** A rear route sign, if available, shall be installed on the rear of the vehicle. **ALTERNATIVE** A run number sign, if available, shall be installed on the vehicle
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5	2	TS 84.4.2 Handset	180	Contractor will install a handset for driver use.	NA	RFP Update	**DEFAULT** No handset. **ALTERNATIVE** A handset for driver use shall be installed. Agency to select from list of available handsets including installation location from OEM option list.
6	2	TS 86. Computer Assisted Dispatching System (CAD/AVL)	181	There will be a requirement to furnish and install a complete automatic vehicle locating (AVL), computer assisted dispatching system as part of this proposal. The equipment provided and installed shall be manufactured and provided by Clever Devices. Each PSTA bus is equipped with various components provided by Clever Devices to include all necessary wiring and software installation. The on board computing processer unit- IVN4 is the central processing unit for each revenue service vehicle in the PSTA fleet. Along with the IVN4 each bus has an interactive Mobile Data Terminal (MDT) which Clever Devices references as a Transit Control Head (TCH). This equipment is interfaced with the bus radio, destination signs, and fare boxes to provide a central "Single Point Logon." All data is transmitted through a cellular network. Clever Devices also provides to PSTA an Automatic Vehicle Monitoring System (AVM-3) for each individual bus controlled by a central networking system. This interface monitors the major vehicle components and generates automatic reports through our Wireless Access Points (file dumping) and real-time monitoring via a cellular network.	NA	RFP Update	**DEFAULT** No computer assisted dispatching system (CAD/AVL). **ALTERNATIVE** A computer assisted dispatching system (CAD/AVL) shall be installed. Agency to select from list of available CAD/AVL systems from OEM options list including installation requirements and configuration. **ALTERNATIVE** Pre-wire only. Agency may select to have vehicle pre-wired only for a CAD/AVL system.
7	3	SP 2.4	51-53	SP 2.4 Contract Deliverables Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.	We request clarification regarding the quantities of manuals needed. Please clarify which section prevails between Table 1: Contract deliverables and SP 5.2 Documentation.	See Addendum	Revised Table 1—Contract Deliverables attached.

Request for Pre-Offer Change or Approved Equal & RFP Updates
PSTA RFP 21-980369

Request #	Addendum	RFP Section	Page	RFP	Questions/Clarification or Approved Equal	Agency Action	Agency response:
8	3	SP 2.4	51	SP 2.4 Contract Deliverables Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.	As per item 18 of Table 1, we understand that the City requests 20 bus orientation video. We propose to offer PSTA the right to film the on-site orientation training which includes a tour of the bus for future internal use.	Approved	NA
9	3	SP 2.5	54	SP 5.2 Documentation The Contractor shall provide an electronic copy and three (3) printed current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy and three (3) printed current parts manual(s), and an electronic copy and three (3) printed standard operator's manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator's manuals and parts books up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.	There are incoherencies between the two section regarding the documentation specifications and Nova Bus would like to offer the best service according to the real needs of PSTA.	See Response	Revised SP 5.2 Documentation: The Contractor shall provide an electronic of current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy of current parts manual(s), and an electronic copy of standard operator's manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator's manuals and parts manuals up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
1.	Bus Testing— Altoona Test Report	Review		Prior to pilot bus delivery	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
2.	List of serialized units installed on each bus	Review		With each delivered bus	~~Electronic media~~ **Electronic Copy**	1 per bus
3.	Copy of Manufacturers' formal Quality Assurance Program	Review		Pre-award site visit	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
4.	QA manufacturing certificate	Review		With each delivered bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	1 per bus
5.	QA purchasing certifications acknowledging receipt of applicable specification	Review		30 days following first Pre-Production Meeting	~~Hardcopy or Electronic media~~ **Electronic Copy**	1 per major Supplier
6.	Pre-Delivery Bus Documentation Package	Review		With each delivered bus	Hardcopy **or** Electronic media	1 per bus
9.	Pre-Production Meeting minutes	Approval		30 days after each meeting	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~2 originals~~ **1**
10.	Driver's log and incident report	Review		With each bus delivery if drive-away service is used	Hardcopy **or** Electronic media	1 per bus
11.	Title documentation	Review		10 days prior to bus delivery	**Hardcopy** ~~or Electronic media~~	1 per bus
12.	Performance bond	Review		30 days following execution of Contract	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
13.	Insurance certificates	Approval		Before Work commences	~~Hardcopy or Electronic media~~ **Electronic Copy**	1

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
14.	Engineering support	Review		During Pre-Production Meeting	~~Contracts~~ **Contacts**	1
15.	Training instructor information	Approval		30 days prior to delivery of pilot bus		
16.	Training curriculum	Approval		30 days prior to delivery of pilot bus	Electronic media	**Qty Per OEM**
17.	Teaching materials	Review		During classroom instruction	~~Hardcopy or~~ Electronic media	1
18.	Professionally prepared mechanics' "Bus Orientation" training video	Review		30 days prior to first production bus	Electronic Media	~~20 each~~ **Qty Per OEM**
19.	Final preventative maintenance manuals	Review		90 days after Agency written approval	~~Hardcopy Electronic media~~ **Electronic Copy**	~~10/100 buses 20~~ **1**
20.	Final diagnostic procedures manuals	Review		90 days after Agency written approval	~~Hardcopy Electronic media~~ **Electronic Copy**	~~10/100 buses 20~~ **1**
21.	Final parts manuals	Approval		90 days after Agency written approval	~~Hardcopy Electronic media~~ **Electronic Copy**	~~10/100 buses 20~~ **1**
22.	Component repair manuals (Agency approval/review period of 90 days from date of receipt)	Approval		90 days after Agency written approval of OEM component repair list	~~Hardcopy Electronic media~~ **Electronic Copy**	~~2 2~~ **1**
23.	Draft preventative maintenance manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**
24.	Draft diagnostic procedures manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**
25.	Draft parts manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
26.	List of OEM component repair manuals	Approval		With pilot bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**
27.	Draft operators' manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus or maximum of 30 days prior to start of production	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**
28.	Final operators' manuals	Review		30 days following Agency approval of draft manual	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~1 per bus~~ **1**
29.	Recommended spare parts list, including bill of materials	Review		60 days prior to shipment of first bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~1~~ **1**
30.	Part number index	Approval		60 days prior to shipment of first bus	~~Hardcopy Spreadsheet~~ **Electronic Copy**	~~1~~ **1**
31.	Current price list	Review		90 days after Agency written approval of draft parts manual	~~Hardcopy~~ **Electronic Copy**	~~20~~ **1**
32.	In-process drawings	Review		30 days prior to production	Scale drawings Electronic Copy	1
33.	Electrical and air schematics	Review		30 days prior to production	~~Hardcopy or Electronic media~~ Electronic Copy	1
34.	As-built drawings	Review		Within 60 days after final bus delivery	~~Electronic media~~ **Electronic Copy**	1
35.	Material samples	Review		By conclusion of Pre-Production Meetings	**Per OEM**	**Per OEM**
36.	Undercoating system program	Approval		First Pre-Production Meeting	~~Hardcopy or Electronic media~~ **Electronic Copy**	1

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
37.	Flooring certificate	Review		First Pre-Production Meeting	~~Certificate/ copy of purchase order~~ **Electronic Copy**	1
38.	Interior features – fire-resistance certificates	Review		Prior to pilot bus completion	Certificates **Electronic Copy**	1
39.	Crashworthiness	Review		Pre-award audit	Certificate **Electronic Copy**	1
40.	Technical review of electronic functionality	Approval		Prior to production	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
41.	Interior security camera layout	Approval		Prior to pilot bus completion	**Electronic** Copies of interior views	1 ~~each~~
42.	Technical review of power plant			Prior to production	**Electronic Copy**	**1**
43.	Power plant certifications	Review		Prior to pilot bus completion	~~Hardcopy or Electronic media~~ **Electronic Copy**	1 ~~each~~
44.	Striping layout	Approval		Prior to production	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
45.	Resolution of issues “subject to Agency approval”	Approval		Prior to production	~~Hardcopy or Electronic media~~ **Electronic Copy**	1

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)
ST. PETERSBURG, FLORIDA

ADDENDUM OF SOLICITATION

1. SOLICITATION NO.:	2. ADDENDUM NO.:	3. EFFECTIVE DATE:	4. BRIEF SOLICITATION DESCRIPTION:
RFP 21-980369	4	August 30, 2021	FLORIDA ELECTRIC TRANSIT BUSES

5. REVISED OFFER SUBMISSION DUE DATE AND TIME:
(*Note: Unless identified below, this solicitation Addendum does not change the Offer Submission Date and Time.)*

The date and/or time specified for receipt of offers is changed as follows:

DATE:
TIME: AM/PM Local

6. REVISED PRE-BID/PROPOSAL CONFERENCE:
(Note: Unless identified below, this solicitation Addendum does not change the Pre-Bid/Proposal Conference, if a conference is scheduled.)

The scheduled pre-bid/proposal conference is changed as follows:

DATE:
TIME: AM/PM Local
LOCATION:

7. ADDENDUM OF SOLICITATION:
The Solicitation identified in Block 1, above, is hereby amended as described in Block 11, below. Except as provided herein, all other provisions of the solicitation, or as heretofore amended, remain unchanged and in full force and effect.

8. REQUIREMENT TO ACKNOWLEDGE ADDENDUM:
Offerors must acknowledge receipt of this Addendum prior to the deadline specified in the solicitation for receipt of offers by one of the following methods:

a. Shall acknowledge the receipt of each individual addendum in their Proposals on the form Acknowledgement of Addenda.

WARNING: Failure of an Offeror to acknowledge receipt of this Addendum, as described herein, may result in REJECTION OF THE OFFER.

***NOTE**: For Invitations for Bids the terms "Offer" and Offeror" shall mean "Bid" and "Bidder", respectively; and for Requests for Proposals or Quotation the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.*

9. FOR FURTHER INFORMATION CALL CONTRACTS SPECIALIST:

Name: Alvin Burns **Email:** aburns@psta.net **(cc:** erandle@psta.net**)**

10. DESCRIPTION OF ADDENDUM:

1. Vendor questions and the Authority's responses.
2. Request for Pre-Offer Change or Approved Equal & RFP Updates
3. Revised Table 1 - Contract Deliverables

	Amendment	VENDOR QUESTION	PSTA RESPONSE
1	1	Will this procurement cover the design & installation of chargers?	No
2	1	Can you confirm if charger design and installation is being requested from this RFP?	No
3	1	As seen in section TS 19. Altoona Testing, it states "*Buses which have not successfully completed an Altoona Test for the type and sizes requested under this RFP will not be considered.*" Please confirm if a proposal will be considered if Altoona testing is to be completed after the proposal submission, and tests from our current similar models are provided in our proposal.	The bus will need to satisfy meeting FTA Pre Award, Post delivery and FAST Act requirements.
4	1	Will the agency allow the submission of question using an excel spreadsheet instead of using CER 2. Request for Pre-Offer Change or Approved Equal, which can facilitate response. Please advise.	Yes
5	2	Is there a desired kW power level for the Depot Charger ?	No
6	2	Can the Proposer submit multiple equipment model options for depot chargers ? In order to best accommodate fleet operators needs, we believe it is important to provide a larger range of chargers capable of various power levels.	Yes. As long as supporting documentation is included in your proposal
7	2	Can sequential charging be proposed, in lieu of simultaneous charging ? In many, if not most instances, sequential charging will meet the fleet's recharging needs.	Please clarify what you are defining as sequential charging and simultaneous charging
8	2	Can the Proposer submit additional unit pricing options to supply charger accessories, as well as corrective and preventative maintenance plans, in addition to charger hardware supply?	Yes
9	2	In the RFP under TS 19. Altoona Testing it states the following... The vehicle must have completed any FTA-required Altoona testing. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure that any and all such failures will not occur shall be submitted to the Agency. DEFAULT An Altoona Test Report shall be provided to the Agency with the Proposal submittal. Buses which have not successfully completed an Altoona Test for the type and sizes requested under this RFP will not be considered. **The Proposer would like to confirm that an Altoona Test Report is required at time of submission?**	Please see addendum 1, question #3

	Amendment	VENDOR QUESTION	PSTA RESPONSE
10	4	In package 3 Qualification are the following required as it states if applicable and we cannot determine if they are applicable and required as part of our submission. 4. Letter for performance bond (if applicable) 5. Letter of commitment for parental financial guarantee (if applicable)	No letter for performance bond is needed
11	4	Will PSTA accept an accord insurance certificate in lieu of #3. Letter for insurance?	No. We need the letter because PSTA is not the only agency purchasing off of this contract. The submittal of the letter is a matter of responsiveness.
12	4	Will PSTA accept a link instead of the complete annual reports as this will increase the size o the file upload. Req: 2. A copy of the three (3) most recent audited financial statements or a statement from the Proposer regarding how financial information may be reviewed by the Agency.	Yes a link is ok to submit.
13	4	#12 Performance Bond. - Please confirm if a performance bond will be required as our surety as advised of the following language: See FTA language as provided by the Surety: The FTA's own website (https://www.transit.dot.gov/funding/procurement/third-party-procurement/bonds) specifically mentions that bonds are not required for Rolling Stock (i.e. buses): "The FTA requirements regarding bonds pertain only to construction contracts and facility improvement contracts. They do not pertain to contracts for equipment, rolling stock, maintenance, or other non-construction services. Grantees may choose to require bonds from contractors performing other non-construction contracts, but this is at the sole discretion of the grantee. FTA bonding requirements are discussed in FTA Circular 4220.1F, Chapter IV, 2.i. and the Best Practices Procurement Manual, Section 3.2.8 – Bonding. (Revised: May 2017)". Rolling Stock is defined as "transit vehicles such as buses, vans, cars, railcars, locomotives, trolley cars and buses, and ferry boats, as well as vehicles used for support services." Source: (https://www.transit.dot.gov/funding/procurement/third-party-procurement/definition-rolling-stock).	There is no Bonding requirement for this solicitation.
14	4	Will PSTA accept the accord certificate to meet this requirement?	No. We need the letter because PSTA is not the only agency purchasing off of this contract. The submittal of the letter is a matter of responsiveness.
15	4	Section 3 - Qualification Section Requirements does not have this requirement. Please confirm if a letter from a suerty is required.	There is no Bonding requirement for this solicitation.

	Amendment	VENDOR QUESTION	PSTA RESPONSE
16	4	Does this procurement require any bonds and if so for how much and for how long as well as how will the bond be released.	No
17	4	What is the qty needed for each model(s) for this RFP? A quantity will assist us in meeting providing PSTA the required delivery schedule.	This is a state schedule that may be used by any agency. All quantities should be based on the assumption of one.
18	4	Shall bidder provide production schedule for each model based on (1) unit of vehicle? If the proposed schedule is identical for each model, can bidder provide one schedule that covers all models?	Yes
19	4	Th Payment due date for purchase of goods or services other than construction services is net forty-five (45) days from the accepted date. We requested approval to reduce the net forty-five days to net thirty days from the accepted date.	As this is a procurement for the state we are bound by Florida statue 218.74. Unfortunately, we have to deny this request.
20	4	Requests approval to limit the liquidated damages to be capped on a per bus basis at 2% of the value of the bus price. The timely performance of the work by the Contractor is of utmost importance to ensure successful completion of the deliveries stipulated in the Contract. Nonetheless, an unlimited liability obligation creates a severe restriction on our ability to disclose financial provision in accordance with Securities Exchange requirements. Hence, the Contractor considers that liquidated damages should be an assessment of direct damages suffered by the Customer, and, in addition be a mechanism to dissuade poor performance.	PSTA is agreeable to the 2% limit provided it does not exceed 80 days. In the event the delivery exceeds 80 days, the contractor would be agreeable to pay $200.00 per day not to exceed 10% of the cost of the vehicle.

Request for Pre-Offer Change or Approved Equal & RFP Updates
PSTA RFP 21-980369

Request #	Addendum	RFP Section	Page	RFP	Questions/Clarification or Approved Equal	Agency Action	Agency response:
1	2	TS 84.1 Camera Surveillance System	179	Provide all wiring and mounting locations for a multi-camera surveillance system, including the installation of cameras, recorder, microphone, etc..	Proposer requests information on whether or not a camera system should be included in the base bus price. Currently, various information pertinent to details of this system such as supplier, number of cameras, type of DVR and functionalities are missing from the technical specifications. Such information is essential to be able to provide accurate pricing and configuration. In light of this, proposer requests approval to provide price of such systems only through optional itemsincluded in CER 6. Pricing Schedule	See Response	**DEFAULT** No camera system. **ALTERNATIVE** A camera system shall be installed. Agency to select from list of available camera systems from OEM options list including installation locations. **ALTERNATIVE** Pre-wire only. Agency may select to have vehicle pre-wired only for a camera system.
2	2	CER 6. Pricing Schedule	NA	NA	The specification of several systems such as Destination signs, Camera Systems, and Automatic Passenger Counters are missing configuration details that are essential for costing. Proposer understands that the its base bus configuration will not have any of such systems, but optional pricing for those will be provided via CER 6. Pricing Schedule for interested agencies. Please confirm our understanding.	See Addendum	Pricing Scheduled has be updated
3	2	TS 81 Destination Signs	177	A destination sign system shall be furnished on the front, on the right side near the front door. Route sign on the rear of the vehicle. All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver. The driver shall be able to access the sign while seated. The destination sign compartments shall meet the following minimum requirements: Compartments shall be designed to prevent condensation and entry of moisture and dirt. Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself. Access shall be provided to allow cleaning of inside compartment window and unit glazing. The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide. Run number sign shall be installed.	NA	RFP Update	**DEFAULT** A destination sign shall be furnished on the front and on the right side (curbside) near the front door. The destination signs shall be Luminator Smart Series III with white LED, or approved equal. **ALTERNATIVE** Agency to select from list of available destination sign systems from OEM provided options list. **ALTERNATIVE** A rear route sign, if available, shall be installed on the rear of the vehicle. **ALTERNATIVE** A run number sign, if available, shall be installed on the vehicle
4	2	TS 84.3 Automatic Passenger Counters (APC)	179	**ALTERNATIVE** An infrared APC system shall be installed. Agency to provide details of APC system, including installation locations and number of buses to be equipped.	NA	RFP Update	**DEFAULT** No automatic passenger counter system. **ALTERNATIVE** An automatic passenger counter system shall be installed. Agency to select from list of available automatic passenger counter systems from OEM options list including installation locations.
5	2	TS 84.4.2 Handset	180	Contractor will install a handset for driver use.	NA	RFP Update	**DEFAULT** No handset. **ALTERNATIVE** A handset for driver use shall be installed. Agency to select from list of available handsets including installation location from OEM option list.
6	2	TS 86. Computer Assisted Dispatching System (CAD/AVL)	181	There will be a requirement to furnish and install a complete automatic vehicle locating (AVL), computer assisted dispatching system as part of this proposal. The equipment provided and installed shall be manufactured and provided by Clever Devices. Each PSTA bus is equipped with various components provided by Clever Devices to include all necessary wiring and software installation. The on board computing processer unit- IVN4 is the central processing unit for each revenue service vehicle in the PSTA fleet. Along with the IVN4 each bus has an interactive Mobile Data Terminal (MDT) which Clever Devices references as a Transit Control Head (TCH). This equipment is interfaced with the bus radio, destination signs, and fare boxes to provide a central "Single Point Logon." All data is transmitted through a cellular network. Clever Devices also provides to PSTA an Automatic Vehicle Monitoring System (AVM-3) for each individual bus controlled by a central networking system. This interface monitors the major vehicle components and generates automatic reports through our Wireless Access Points (file dumping) and real-time monitoring via a cellular network.	NA	RFP Update	**DEFAULT** No computer assisted dispatching system (CAD/AVL). **ALTERNATIVE** A computer assisted dispatching system (CAD/AVL) shall be installed. Agency to select from list of available CAD/AVL systems from OEM options list including installation requirements and configuration. **ALTERNATIVE** Pre-wire only. Agency may select to have vehicle pre-wired only for a CAD/AVL system.
7	3	SP 2.4	51-53	SP 2.4 Contract Deliverables Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.	We request clarification regarding the quantities of manuals needed. Please clarify which section prevails between Table 1: Contract deliverables and SP 5.2 Documentation.	See Addendum	Revised Table 1—Contract Deliverables attached.

Request for Pre-Offer Change or Approved Equal & RFP Updates
PSTA RFP 21-980369

Request #	Addendum	RFP Section	Page	RFP	Questions/Clarification or Approved Equal	Agency Action	Agency response:
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9	3	SP 2.5	54	SP 5.2 Documentation The Contractor shall provide an electronic copy and three (3) printed current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy and three (3) printed current parts manual(s), and an electronic copy and three (3) printed standard operator's manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator's manuals and parts books up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.	There are incoherencies between the two section regarding the documentation specifications and Nova Bus would like to offer the best service according to the real needs of PSTA.	See Response	Revised SP 5.2 Documentation: The Contractor shall provide an electronic of current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy of current parts manual(s), and an electronic copy of standard operator's manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator's manuals and parts manuals up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.
10	4	TS 7.4	85	**TS 7.4 Operating Range** The operating range of the coach shall be designed to meet the operating profile as stated in the "Design Operating Profile" section. The operating range of the coach on a single battery charge shall be designed to meet the following targeted ranges per the operating profiles as stated in the "Design Operating Profile" section.	Will PSTA specify the minimum operating range requirement?	See Response	There are no minimum range requirement specifications established in this RFP. As stated in the RFP and during the pre-proposal meeting Proposers shall supply the range information requested in TS 8.1 for each size bus being submitted for consideration utilizing the Altoona On-Road Engergy Consumption and Range Tests for buses. Specifically, CBD, ART, and COM Duty Cycles.
11	4	TS 7.3	85	**TS 7.3 Acceleration** Braking application and performance shall remain consistent regardless of system state of charge (SOC) or other variances related to regenerative braking.	We would like to clarify that electric bus is equipped with two braking systems to decelerate the bus. One is a pneumatic friction-based brake system, and another is a regenerative braking system. The braking performance is different with and without regenerative braking. Regenerative braking is availiable(braking performance is consistent) regardless of system SOC in our design. While, if the regenerative braking is limited or not availiable due to special condition, the braking performance is different. We request approval of the design.	Approved	NA
12	4	TS 8.2	87	**TS 8.2 Design Operating Profile (Battery Electric Bus)** Supply a performance summary for the exact bus(es) to be built, utilizing a 130% passenger load. Data to show AT LEAST the following: time to speed on flat ground, 5%, 7%, 10% and maximum grade for speeds of 5, 10, 15, 25, 35 mph (or maximum for each grade).	We would like clarity that as opearaing range varies with road conditions, wheather, bus configuration, driver behavior etc., We request the agency to provide a detail ruote profile data(including bus speed vs time, route grades vs bus speed, preferably at a sampling frequency of 1 Hz or greater)	See Response	Detailed route data is not available. As stated in the RFP and during the pre-proposal meeting Proposers shall supply the range information requested in TS 8.1 for each size bus being submitted for consideration utilizing the Altoona On-Road Engergy Consumption and Range Tests for buses. Specifically, CBD, ART, and COM Duty Cycles. Assume ambient temperature of 90 deg F and weather customary to the State of Florida.
13	4	TS 8.2	87	**TS 8.2 Design Operating Profile (Battery Electric Bus)** Supply a performance summary for the exact bus(es) to be built, utilizing a 130% passenger load. Data to show AT LEAST the following: time to speed on flat ground, 5%, 7%, 10% and maximum grade for speeds of 5, 10, 15, 25, 35 mph (or maximum for each grade).	If detail route profile data is not available, We request approval to provide Altoona cycle operaing range for reference.	See Response	See answers to previous questions.
14	4	TS 9.1.4	90	**TS 9.1.4 Energy Storage System and Controller** **Energy Storage System** A phased automatic shutdown system shall be provided	We would like PSTA to cliarify the "A phased automatic shutdown system". What is the function? How does it work?	See Response	The intent of the specification is that sufficient warnings will be given to the operator that the SOC is running low. The intent of a "phase automatic shutdown" is, as an example, at 30% SOC a warning indicator, audible tone, is given, at 20% SOC the bus may derate in performance to conserve energy, at 10% SOC the bus goes into "limp-home" mode, at 0% the bus automatically shuts down. The levels of SOC stated previously are only used to illustrate the intent. Proposers shall specifiy what form of low-SOC shutdown protocols are in use.
15	4	TS 9.1.4	92	**TS 9.1.4 Energy Storage System and Controller** **Energy Storage System** **Battery Charging** The bus shall support an SAE-approved charging standard (SAE J3068 AC and/or SAE J1772 DC).	Will PSTA accept our AC charging as an option? Our AC chagring has SAE J-3068 connector but not fully compliant to SAE J-3068.	See Response	Manufacturer shall provide a detailed description of its charging system and specify its compliance with one of the listed standards. If the charging system cannot meet compliance provide detailed information as part of the Proposal so that the Evaluation Committee may review and make a determination on acceptance.
16	4	TS 9.1.6	93	**TS 9.1.6 Hybrid System Controller (HSC)** The HSC regulates energy flow throughout hybrid system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (e.g., voltages, currents, temperatures, etc.) within specified operating ranges.	We requests to delete this requirement as the RFP is for electric bus.	See Response	If the specification does not apply to a manufacturer's bus design the Proposer may consider it not applicable.

Request for Pre-Offer Change or Approved Equal & RFP Updates
PSTA RFP 21-980369

<table>
<tr><th>Request #</th><th>Addendum</th><th>RFP Section</th><th>Page</th><th>RFP</th><th>Questions/Clarification or Approved Equal</th><th>Agency Action</th><th>Agency response:</th></tr>
<tr><td>17</td><td>4</td><td>TS 19</td><td>99</td><td>TS 19. Altoona Testing

DEFAULT An Altoona Test Report shall be provided to the Agency with the Proposal submittal.</td><td>Will PSTA accept to provide altoona report prior to first bus delivery? And FTA does allow for test to be accepted upon delivery of the first bus.</td><td>See Response</td><td>The bus will need to satisfy meeting FTA Pre Award, Post delivery and FAST Act requirements.</td></tr>
<tr><td>18</td><td>4</td><td>TS 26.5</td><td>103</td><td>TS 26.5 Construction

Plywood shall be certified at the time of manufacturing by an industry-approved third-party inspection agency such as APA – The Engineered Wood Association (formerly the American Plywood Association).</td><td>We would like clarity that the standard floor is Coosa Composite fiberglass composite floor. Coosa fiberglass composite floor can meet both FMVSS 302 and docekt 90 requirement. And it is also Altoona tested in our bus.
We requests approval of Coosa fiberglass floor.</td><td>Approved</td><td>NA</td></tr>
<tr><td>19</td><td>4</td><td>TS 56</td><td>148</td><td>TS 56. Roof Ventilators

ALTERNATIVE
Three Roof Ventilators
(Used in articulated buses.)</td><td>Will PSTA accept two roof ventilators in articulated bus?</td><td>See Response</td><td>Yes, so long as number of ventilators satisfies compliance with FMVSS for minimum number of escape hatches.</td></tr>
<tr><td>20</td><td>4</td><td>TS 52</td><td>144</td><td>TS 52. Capacity and Performance

ALTERNATIVE
R134a
The air conditioning system shall meet these performance requirements using R134a</td><td>R410a has a greater efficiency,lower price than R134a. Also R410a is more friendly to environment.
We request approval for OUR HAVC which uses R410a for the system.</td><td>Approved</td><td>NA</td></tr>
<tr><td>21</td><td>4</td><td>TS 78.1.2</td><td>168</td><td>TS 78.1.2 Rear Door(s)

In cases where street-side and curbside doors are chosen, provisions shall be made for operating the front door, curbside rear door(s) and street-side rear door(s) independently or in the combinations shown in Table 7 while providing positive tactile feedback to the operator identifying the door control selection.

TABLE 7
Door Operating Combinations
<table><tr><th>Front</th><th>Curbside Rear</th><th>Street-Side Rear</th></tr><tr><td>Closed</td><td>Closed</td><td>Closed</td></tr><tr><td>Open</td><td>Closed</td><td>Closed</td></tr><tr><td>Open</td><td>Open</td><td>Closed</td></tr><tr><td>Open</td><td>Closed</td><td>Open</td></tr><tr><td>Open</td><td>Open</td><td>Open</td></tr><tr><td>Closed</td><td>Open</td><td>Closed</td></tr><tr><td>Closed</td><td>Closed</td><td>Open</td></tr><tr><td>Closed</td><td>Open</td><td>Open</td></tr></table></td><td>Does PSTA need one front door, one curbside rear door and one street-side rear door in articulated bus? If not, please specify door number and door location.</td><td>See Response</td><td>Disregard all references to "street-side" doors for articulated bus in this RFP. The doors being specified will be curbside only, mounted in the standard manufacturer locations.</td></tr>
<tr><td>22</td><td>4</td><td>TS 5.9.1</td><td>78</td><td>TS 5.9.1 Technical/Service Representatives

The Contractor shall, at its own expense, have one or more competent technical service representatives available on request to assist the Agency in the solution of engineering or design problems within the scope of Services and the specifications that may arise during the warranty period. This does not relieve the Contractor
of responsibilities under the provisions of “Section 7: Warranty Requirements.”

The Contractor shall provide full-time, on-site technical support representative for the buses and charging and
associated equipment for the first two (2) years after bus delivery, with annual renewal options for ten (10)
more years.</td><td>Proponent requests that requirement for full-time on-site technical support representatives for two years and beyond be removed as this will be cost prohibitive.

Proponent has technical support staff for the bus that can provide solutions remotely or a technician in a service truck could be dispatched within 24-48 hours. Technical service for chargers also would be remote and an on-site representative could be provided within 24-48 hours.

We request your approval.</td><td>See Response</td><td>PSTA approves of the request to delete the requirement of providing a full-time, on-site technical support representative for two years after bus delivery with annual renewal options for ten years.

All other language in TS 5.9.1 Technical/Service Representatives still applies.

Proposer shall provide sufficient information in their proposal detailing their field service support capabilities, including response times, staff levels, service centers (if applicable), for both the bus and charging equipment.</td></tr>
</table>

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
1.	Bus Testing— Altoona Test Report	Review		Prior to pilot bus delivery	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
2.	List of serialized units installed on each bus	Review		With each delivered bus	~~Electronic media~~ **Electronic Copy**	1 per bus
3.	Copy of Manufacturers' formal Quality Assurance Program	Review		Pre-award site visit	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
4.	QA manufacturing certificate	Review		With each delivered bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	1 per bus
5.	QA purchasing certifications acknowledging receipt of applicable specification	Review		30 days following first Pre-Production Meeting	~~Hardcopy or Electronic media~~ **Electronic Copy**	1 per major Supplier
6.	Pre-Delivery Bus Documentation Package	Review		With each delivered bus	Hardcopy **or** Electronic media	1 per bus
9.	Pre-Production Meeting minutes	Approval		30 days after each meeting	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~2 originals~~ **1**
10.	Driver's log and incident report	Review		With each bus delivery if drive-away service is used	Hardcopy **or** Electronic media	1 per bus
11.	Title documentation	Review		10 days prior to bus delivery	**Hardcopy** ~~or Electronic media~~	1 per bus
12.	Performance bond	Review		30 days following execution of Contract	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
13.	Insurance certificates	Approval		Before Work commences	~~Hardcopy or Electronic media~~ **Electronic Copy**	1

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
14.	Engineering support	Review		During Pre-Production Meeting	~~Contracts~~ **Contacts**	1
15.	Training instructor information	Approval		30 days prior to delivery of pilot bus		
16.	Training curriculum	Approval		30 days prior to delivery of pilot bus	Electronic media	**Qty Per OEM**
17.	Teaching materials	Review		During classroom instruction	~~Hardcopy or~~ Electronic media	1
18.	Professionally prepared mechanics' "Bus Orientation" training video	Review		30 days prior to first production bus	Electronic Media	~~20 each~~ **Qty Per OEM**
19.	Final preventative maintenance manuals	Review		90 days after Agency written approval	~~Hardcopy Electronic media~~ **Electronic Copy**	~~10/100 buses 20~~ **1**
20.	Final diagnostic procedures manuals	Review		90 days after Agency written approval	~~Hardcopy Electronic media~~ **Electronic Copy**	~~10/100 buses 20~~ **1**
21.	Final parts manuals	Approval		90 days after Agency written approval	~~Hardcopy Electronic media~~ **Electronic Copy**	~~10/100 buses 20~~ **1**
22.	Component repair manuals (Agency approval/review period of 90 days from date of receipt)	Approval		90 days after Agency written approval of OEM component repair list	~~Hardcopy Electronic media~~ **Electronic Copy**	~~2 2~~ **1**
23.	Draft preventative maintenance manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**
24.	Draft diagnostic procedures manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**
25.	Draft parts manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
26.	List of OEM component repair manuals	Approval		With pilot bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**
27.	Draft operators' manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus or maximum of 30 days prior to start of production	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~10~~ **1**
28.	Final operators' manuals	Review		30 days following Agency approval of draft manual	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~1 per bus~~ **1**
29.	Recommended spare parts list, including bill of materials	Review		60 days prior to shipment of first bus	~~Hardcopy or Electronic media~~ **Electronic Copy**	~~1~~ **1**
30.	Part number index	Approval		60 days prior to shipment of first bus	~~Hardcopy Spreadsheet~~ **Electronic Copy**	~~1~~ **1**
31.	Current price list	Review		90 days after Agency written approval of draft parts manual	~~Hardcopy~~ **Electronic Copy**	~~20~~ **1**
32.	In-process drawings	Review		30 days prior to production	Scale drawings Electronic Copy	1
33.	Electrical and air schematics	Review		30 days prior to production	~~Hardcopy or Electronic media~~ Electronic Copy	1
34.	As-built drawings	Review		Within 60 days after final bus delivery	~~Electronic media~~ **Electronic Copy**	1
35.	Material samples	Review		By conclusion of Pre-Production Meetings	**Per OEM**	**Per OEM**
36.	Undercoating system program	Approval		First Pre-Production Meeting	~~Hardcopy or Electronic media~~ **Electronic Copy**	1

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
37.	Flooring certificate	Review		First Pre-Production Meeting	~~Certificate/ copy of purchase order~~ **Electronic Copy**	1
38.	Interior features – fire-resistance certificates	Review		Prior to pilot bus completion	Certificates **Electronic Copy**	1
39.	Crashworthiness	Review		Pre-award audit	Certificate **Electronic Copy**	1
40.	Technical review of electronic functionality	Approval		Prior to production	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
41.	Interior security camera layout	Approval		Prior to pilot bus completion	**Electronic** Copies of interior views	1 ~~each~~
42.	Technical review of power plant			Prior to production	**Electronic Copy**	**1**
43.	Power plant certifications	Review		Prior to pilot bus completion	~~Hardcopy or Electronic media~~ **Electronic Copy**	1 ~~each~~
44.	Striping layout	Approval		Prior to production	~~Hardcopy or Electronic media~~ **Electronic Copy**	1
45.	Resolution of issues “subject to Agency approval”	Approval		Prior to production	~~Hardcopy or Electronic media~~ **Electronic Copy**	1

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)
ST. PETERSBURG, FLORIDA

ADDENDUM OF SOLICITATION

1. SOLICITATION NO.:	2. ADDENDUM NO.:	3. EFFECTIVE DATE:	4. BRIEF SOLICITATION DESCRIPTION:
RFP 21-980369	5	September 1, 2021	FLORIDA ELECTRIC TRANSIT BUSES

5. REVISED OFFER SUBMISSION DUE DATE AND TIME:
(Note: Unless identified below, this solicitation Addendum does not change the Offer Submission Date and Time.)

The date and/or time specified for receipt of offers is changed as follows:

DATE: SEPTEMBER 21, 2021
TIME: 10:00AM EST

6. REVISED PRE-BID/PROPOSAL CONFERENCE:
(Note: Unless identified below, this solicitation Addendum does not change the Pre-Bid/Proposal Conference, if a conference is scheduled.)

The scheduled pre-bid/proposal conference is changed as follows:

DATE:
TIME: AM/PM Local
LOCATION:

7. ADDENDUM OF SOLICITATION:
The Solicitation identified in Block 1, above, is hereby amended as described in Block 11, below. Except as provided herein, all other provisions of the solicitation, or as heretofore amended, remain unchanged and in full force and effect.

8. REQUIREMENT TO ACKNOWLEDGE ADDENDUM:
Offerors must acknowledge receipt of this Addendum prior to the deadline specified in the solicitation for receipt of offers by one of the following methods:

a. Shall acknowledge the receipt of each individual addendum in their Proposals on the form Acknowledgement of Addenda.

WARNING: Failure of an Offeror to acknowledge receipt of this Addendum, as described herein, may result in REJECTION OF THE OFFER.

***NOTE**: For Invitations for Bids the terms "Offer" and Offeror" shall mean "Bid" and "Bidder", respectively; and for Requests for Proposals or Quotation the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.*

9. FOR FURTHER INFORMATION CALL CONTRACTS SPECIALIST:

Name: Alvin Burns **Email:** aburns@psta.net **(cc:** erandle@psta.net**)**

10. DESCRIPTION OF ADDENDUM:

Please reference Box #5 for Revised Offer Submission Due Date
PROPOSAL DUE DATE HAS CHANGED FROM SEPTEMBER 14, 2021, TO SEPTEMBER 21, 2021
Proposal due date in Block 5 as been corrected to match Block 10.

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)
ST. PETERSBURG, FLORIDA

ADDENDUM OF SOLICITATION

1. SOLICITATION NO.:	2. ADDENDUM NO.:	3. EFFECTIVE DATE:	4. BRIEF SOLICITATION DESCRIPTION:
RFP 21-980369	6	September 10, 2021	FLORIDA ELECTRIC TRANSIT BUSES

5. REVISED OFFER SUBMISSION DUE DATE AND TIME:
(*Note: Unless identified below, this solicitation Addendum does not change the Offer Submission Date and Time.)*

The date and/or time specified for receipt of offers is changed as follows:

DATE:

TIME:

6. REVISED PRE-BID/PROPOSAL CONFERENCE:
(Note: Unless identified below, this solicitation Addendum does not change the Pre-Bid/Proposal Conference, if a conference is scheduled.)

The scheduled pre-bid/proposal conference is changed as follows:

DATE:

TIME: AM/PM Local

LOCATION:

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9. FOR FURTHER INFORMATION CALL CONTRACTS SPECIALIST:

Name: Alvin Burns **Email:** aburns@psta.net **(cc:** erandle@psta.net**)**

10. DESCRIPTION OF ADDENDUM:

1. Request for Pre-Offer Change or Approved Equal & RFP Updates
2. Revised Ordering Instruction

Request for Pre-Offer Change or Approved Equal & RFP Updates
PSTA RFP 21-980369

Request #	Addendum	RFP Section	Page	RFP	Questions/Clarification or Approved Equal	Agency Action	Agency response:
97	6	SP 2.4 Contract Deliverables	51	**SP 2.4 Contract Deliverables** Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.	Table 1, Line 12, lists the Performance Bond as an item to be reviewed 30 days following contract execution. There does not seem to be any actual requirement for a performance bond in the RFP documents. Respectfully request that line 12 on the Contract Deliverables Table be removed or noted as not applicable.	See Response	Table 1, Line 12 is not applicable
96	6	TS 5.9.1	78	**TS 5.9.1 Technical/Service Representatives** The Contractor shall, at its own expense, have one or more competent technical service representatives available on request to assist the Agency in the solution of engineering or design problems within the scope of Services and the specifications that may arise during the warranty period. This does not relieve the Contractor of responsibilities under the provisions of "Section 7: Warranty Requirements." The Contractor shall provide full-time, on-site technical support representative for the buses and charging and associated equipment for the first two (2) years after bus delivery, with annual renewal options for ten (10) more years.	In reference to section TS 5.9.1 Technical/Service Representatives, we respectfully request clarification on how cost can be captured on a per bus basis for full-time, on-site technical support representatives for two (2) years. If multiple agencies have the ability to order buses, or even a single bus, the way this is written seems to indicate that the Contractor would have to deploy a full-time support representative to each and every customer location, each for a minimum of two years. Based on the above considerations, we respectfully request that this requirement be removed.	See Addendum	See Aaddendum 4 Question #10
95	6	TS 88.4	187	**TS 88.4 Cost of Ownership** The Agency is interested in the long term cost of ownership, particularly the maintenance requirements that are routine, scheduled and/or reasonably predictable. In addition to the Proposers submittals describing and defining the service and maintenance requirements for the equipment, a "Cost of Ownership" template has been developed and included in the forms to be filled out by the Proposer as an element of the submittal package. This form itemizes tasks in three areas, PMI, scheduled maintenance and major component replacement.	According to Section TS 88.4 "Cost of Ownership" a template is quoted in this section to be filled out with the cost of ownership information. However, New Flyer did not find the template in the forms section of the RFP. New Flyer would like to clarify if Pinellas will provide the template.	See Response	See Question 72 for response
94	6	TS 30.1 Wheels	108	All wheels shall be interchangeable except for the middle axle of an artic where a super single tire size is used and shall be removable without a puller	GILLIG wishes to advise that our design would inlcude 9 inch wheels at the front axle and 8.25 inch wheels at the rear axle. This is inherent to our design in order to provide adequate weight rating's needed for the Battery Electric Bus to safely carry the required 75 passengers inclusive of the driver. GILLIG requests approval	See Response	Not approved, need more clarification to understand why there are different wheel sizes between the front and rear axles.
93	6	TS 31.3.4 Steering Wheel Telescopic Adjustment	110	At Maximum Telescopic Height Adjustment: 0 Degree 34in Height	GILLIG wishes to clarify that our proposed steering column with 16" wheel meets and exceeds the Table 4 chart at all levels with one small difference. GILLIG requests approval to provide a height of 33.8 in. at 0 degrees slope at Maximum Telescopic Height Adjustment	Approved	NA
92	6	TS 32. Drive Axle	110	The drive shaft shall be guarded to prevent hitting any critical systems, including brake lines, coach floor or the ground, in the event of a tube or universal joint failure.	GILLIG wishes to advise that our design includes a guard that goes around and below the drive shaft. Although the guard is not above the drive shaft, the inherent position of the drive shaft is below chassis structural beam and therefore protects the coach floor. GILLIG requests concurrence	Approved	NA
91	6	TS 35.4 Hubs and Drums/Discs	113	The bus shall be equipped with brake drums. Brake drums shall allow machining for oversized linings per manufacturer's specifications.	GILLIG wishes to advise that our Battery Electric Bus design is only available with Meritor Air Disc Brakes on All Axles. GILLIG requests approval to omit a Drum Brake option	See Response	Proposer's may specify whichever braking systems are inherent to the design of the bus.
90	6	TS 44.5 Normal Bus Operation Instrumentation and Controls	129	Table 6 Transit Bus Instruments and Alarms	GILLIG requests approval that the instrumentation, switches, controls and indicators can be discussed at the pre-production meeting if GILLIG is the successful bidder. This is due to the unique design of our bus. GILLIG is providing a generic Battery Electric Bus dash layout for review. Please see attached. 	See Response	Proposer's may specify whichever dash layout is inherent to the design of the bus.
89	6	TS 44.6.2 Pedal Dimensions and Position	133	The floor mounted accelerator pedal shall be 10-inches to 12-inches long and 3-inches to 4-inches wide.	GILLIG requests approval to provide an accelerator pedal that is 9-inches long and 3.134-inches wide	Approved	NA
88	6	TS 57. Maintainability	148	High and low refrigerant pressure electronic gauges to be located in the return air area.	GILLIG requests approval to provide a Refrigerant Pressure Display Module in place of gauges in the return air area. This is the standard of the HVAC vendor Thermo King.	Approved	NA
87	6	WR 1.1.4 Propulsion System	190	Propulsion system components, including the engine, transmission or drive motors, and generators (for hybrid technology) and drive and non-drive axles shall be warranted to be free from Defects and Related Defects for the standard two years or 100,000 miles, whichever comes first. An Extended Warranty to a maximum of five years or 300,000 miles, whichever comes first, may be purchased at an additional cost.	GILLIG wishes to clarify that our Powertrain includes a standard warranty from Cummins for Three Years / 100,000 miles with an extension available to a total of Five Years / 250,000 Miles. This is the only available powrtrain warranty available from Cummins. GILLIG requests approval	See Response	Proposer's should submit warranty terms as part of their proposal for consideration by the evaluation committee.
86	6	WR 1.1.6 Extended Warranty	190	PSTA requires the following additional subsystems to be warranted to be free from Defects and Related Defects for six (6) years. • Batteries • Traction Motor • Inverters • Battery Charger • On-Route Battery Charger	GILLIG wishes to clarify for the following components: - Batteries will include a six (6) year warranty per specification - Traction Motor and Inverters would fall into the aformentioned powertrain warranty of Three (3) Years / 100,000 miles with option to extend to Five (5) Years / 250,000 miles - Battery Charger & On Route Chargers include a base Two (2) Years warranty with optional pricing available up to six (6) years. This pricing will be noted on the Alternatives Pricing sheet GILLIG requests approval	See Response	Proposer's should submit warranty terms as part of their proposal for consideration by the evaluation committee.

Request for Pre-Offer Change or Approved Equal & RFP Updates
PSTA RFP 21-980369

Request #	Addendum	RFP Section	Page	RFP	Questions/Clarification or Approved Equal	Agency Action	Agency response:
85	6	WR 1.3.1 Pass-Through Warranty	192	Should the Contractor elect to not administer warranty claims on certain components and wish to transfer this responsibility to the sub-suppliers, or to others, the Contractor shall request this waiver.	GILLIG is formally requesting a waiver to not administer warranty claims on major components, such as Power Train Components supplied by Cummins, HVAC by Thermo King, Axles by Meritor, destination signs & wheel chair ramp	See Response	Proposer's should submit warranty terms as part of their proposal for consideration by the evaluation committee.
84	6	WR 1.4 Fleet Defects	192	A Fleet Defect shall apply only to the base warranty period in sections entitled "Complete Bus," "Propulsion System" and "Major Subsystems."	GILLIG wishes to clarify that Fleet defect warranty does not apply to major components (Propulsion System, HVAC, Destination Signs, etc.). Major component manufacturers will not recognize and/or participate in fleet defect clauses. GILLIG does work with and will assist the Agency and Major component suppliers to come to a satisfactory resolution in such cases that would otherwise fall into a fleet defect category. GILLIG agrees to the Fleet Defects provisions for the Base warranty as detailed, but cannot guarantee the "Propulsion System" and "Major Subsystems". GILLIG requests concurrence	See Response	Proposer's should submit warranty terms as part of their proposal for consideration by the evaluation committee.
83	6	10. INDEMNIFICATION	Addendum 1, page 4	10.01 Indemnification. The Parties recognize that Contractor is an independent contractor agrees to assume liability for and indemnify, hold harmless, and defend PSTA, its board members, officers, employees, agents and attorneys, of, from, and against all liability and expense, including reasonable attorneys' fees, in connection with any and all claims, demands, damages, actions, causes of action, and suits in equity of whatever kind or nature, including claims for personal injury, property damage, equitable relief, or loss of use, arising out of the execution, performance, nonperformance, or enforcement of this Agreement, whether or not due to or caused by the negligence of PSTA, its board members, officers, employees, agents, and/or attorneys excluding only the sole negligence of PSTA, its officers, employees, agents, and attorneys. This includes claims made by the employees of Contractor against PSTA, and Contractor hereby waives its entitlement, if any, to immunity under Section 440.11, Florida Statutes. Contractor's liability hereunder shall include all attorneys' fees and costs incurred by PSTA in the enforcement of this indemnification provision. Notwithstanding anything contained herein to the contrary, this indemnification provision shall not be construed as a waiver of any immunity from or limitation of liability to which PSTA is entitled to pursuant to the doctrine of sovereign immunity or Section 768.28, Florida Statutes. The obligations contained in this provision shall survive termination of this Agreement, however terminated, and shall not be limited by the amount of any insurance required to be obtained or maintained under this Agreement. 10.02 Control of Defense. Subject to the limitations set forth in this provision, Contractor shall assume control of the defense of any claim asserted by a third party against PSTA arising from or in any way related to this Agreement and, in connection with such defenses, shall appoint lead counsel, in each case at Contractor's expense. Contractor shall have the right, at its option, to participate in the defense of any third party claim, without relieving Contractor of any of its obligations hereunder. If Contractor assumes control of the defense of any third party claim in accordance with this paragraph, Contractor shall obtain the prior written consent of PSTA before entering into any settlement of such claim. Notwithstanding anything to the contrary in this provision, Contractor shall not assume or maintain control of the defense of any third party claim, but shall pay the fees of counsel retained by PSTA and all expenses including experts' fees, if (i) an adverse determination with respect to the third party claim would, in the good faith judgment of PSTA, be detrimental in any material respect of PSTA's reputation; (ii) the third party claim seeks an injunction or equitable relief against PSTA; or (iii) Contractor has failed or is failing to prosecute or defend vigorously the third party claim. Each party shall cooperate, and cause its agents to cooperate, in the defense or prosecution of any third party claim and shall furnish or cause to be furnished such records and information, and attend such conferences, discovery proceedings, hearings, trials, or appeals, as may be reasonably requested in connection therewith.	GILLIG requests the Indemnification clause of this procurement be the same as was agreed to in the State of Florida Heavy Duty Bus Contract with the JTA. Should that not be aggreable to PSTA, GILLIG requests the APTA Recommended Indemnification wording for FTA funded procurements which offers protection for both the Procuring Agency and the Contractor. Reference the attached JTA Contract and APTA INDEMNIFICATION wording.  	See Response	This will be handled in the negotiation portion of the solcaition process
82	6	Section 2, LOCAL TAXES	19	The Contractor shall be liable for payment of all local taxes applicable to the complete bus as delivered and should add these amounts to the Proposal price.	GILLIG requests that the Procuring Agency advise bidders/proposers of any Local, City, County, State, Franchise or Income taxes, tariffs, fees, business licenses and special taxes, or licenses that will need to be paid and/or purchased by the successful bidder/proposer as part of the performance of this contract or option of this contract.		PSTA can not advise on this. It's the contractors responsibility to do their due diligence.
81	6	Section 2, IP 10.2 MULTIPLE AWARD	19	PSTA will make the Contract awards, if any, to the responsive and responsible Proposers who are in compliance . . .	Please advise the projected award date for this procurement?		PSTA intends on taking this to our October 27, 2021 Board of Directors meeting for approval
80	6	Section 3, GC 5 TITLE & WARRANTY OF TITLE	34	Adequate documents for registering title for each of the buses delivered under this Contract in Pinellas County Florida shall be provided to the Agency not fewer than ten (10) business days before delivery to the Agency. Upon acceptance of each bus, the Contractor warrants that the title shall pass to the Agency free and clear of any and all encumbrances.	GILLIG proposes to provide the following industry standard documents if we are the successful bidder for this procurement: 1. Our Manufacturer's Statement of Origin (MSO) document for each vehicle. This form has been approved in all 50 states and transfers ownership directly from the manufacturer to the procuring agency. 2. The procuring agency provides the MSO document to your local Department of Motor Vehicles in order to transfer ownership and secure the title for each vehicle. 3. The procuring agency would be responsible for title fees or licenses, if any.	Approved	Agree and approved
79	6	Section 4, SP 1.2 PILOT BUS	48	. . . No later than seven (7) days after the end of the 30-day test, the Agency shall issue a written report to the Contractor that advises the Contractor of any noncompliance issues and/or any proposed modifications or changes required on the remaining vehicles.	GILLIG requests the agency provide a wriitten report of any non-compliance issue to the contractor within 30 days after delivery. If no issues are reported, acceptance occurs on day 31 or if the agency puts the bus in revenue service. The PILOT bus will have completed full compliance testing at the factory to allow resolution of any Agency issues prior to shipment.	Approved	PSTA approves this request
78	6	Section 4, SP 2.4 CONTRACT DELIVERABLES - TABLE 1	51	12. PERFORMANCE BOND	Please advise if a PERFORMANCE BOND will be required for this procurement? GILLIG is concerned that the exclusion of this bond will permit irresponsible companies to bid without having suffcient resources to fully satisfy the contract or provide proper long term support for the procuring agency. GILLIG requests the addition of a 100% Performance Bond requirement to your contractual term for all bidders.	See Response	No performance bond is required
77	6	Section 4, SP 3 PAYMENT	53	Payment due date is calculated from time the Agency Accounts Payable Accountant has received and accepted the invoice pursuant to the Florida Prompt Payment Act. Payment due date for purchase of goods or services other than construction services is net forty-five (45) days from the accepted date. No advance payments are authorized. Payment will be made for only actual services or commodities that have been received and accepted by the Agency.	GILLIG requests revision of this section to the current industry standard and APTA recommended payment terms: Payment due date for purchase of goods or services other than construction services is net thirty (30) days from the accepted date.	Denied	PSTA can not approve this request, due to FL statue Florida Prompt payment Act FS218.72 and FS218.73

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76	6	Section 4, SP 3.1, PAYMENT TERMS	53	The Agency shall make payments for buses at the unit prices itemized in the price schedule within 45 days after the delivery and acceptance of each bus and receipt of a proper invoice. The Agency shall make payments for spare parts and/or equipment at the unit prices itemized in the price schedule within 45 days after the delivery and acceptance of said spare parts and/or equipment and receipt of a proper invoice.	GILLIG requests revision to the current industry standard and APTA recommended payment terms for FTA funded procurements: The Agency shall make payments for buses at the unit prices itemized in the price schedule within 30 days after the delivery and acceptance of each bus and receipt of a proper invoice. The Agency shall make payments for spare parts and/or equipment at the unit prices itemized in the price schedule within 30 days after delivery and acceptance of said spare parts and/or equipment and receipt of a proper invoice.	Denied	PSTA can not approve this request, due to FL statue Florida Prompt payment Act FS218.72 and FS218.73
75	6	Section 4, SP 7. INSURANCE	55	Contractor must provide a certificate of insurance and endorsement in accordance with the insurance re-requirements listed below by the Effective Date. ...	GILLIG maintains and pays the premiums for insurance of the types and limits it deems sufficient for its protection. The Additional Insured endorsement can be provided as requested. Please note we exceed the requested limits in many areas. Enclosed is a copy of our Certificate of Liability Insurance for your information and approval.	Approved	NA
74	6	Section 4, SP7. PROFESSIONAL LIABILITY INSURANCE	58	Professional Liability Insurance recognizes that the work governed by this Contract involves the furnishing of advice or services of a professional nature, Contractor shall pur-chase and maintain throughout the life of this Contract, Professional Liability Insurance which will re-respond to damages resulting from any claim arising out of the performance of professional services or any error or omission of Contractor arising out of work governed by this Contract. The minimum limits of liability shall be: • $1,000,000 per Claims Made Bases/or per Occurrence • $3,000,000 Aggregate If coverage is provided on a claims made basis, Contractor agrees to maintain such Professional Liability Insurance, as described herein, for a period of at least two (2) years following the conclusion of this Contract, or purchase an extended claims reporting period of two (2) years following the expiration of this Contract.	GILLIG requests deletion of the requirement for Contractor to have Professional Liability Insurance. This coverage is only necessary for professional services such as engineering, architecture, etc. Contractor's General Liability will provide the Agency with insurance protection for product related liability issues.	Approved	Request approved
73	6	SECTION 4, SP 8 Software Escrow Account	59	All the Contractor's policies shall contain an endorsement naming the Agency as an additional insured and providing that written notice shall be given to the Agency's location at least thirty (30) days prior to termination, cancellation or material reduction of coverage in the policy, provided, however, that such notice may be given on ten (10) days' notice if the termination is due to nonpayment of premium. Upon execution of the Contract, the Contractor shall provide the Agency a list of all OEM software comprising proprietary works ("Proprietary Software") for all major vehicle subsystems. From time to time and only upon request, information contained within the listed software may be made available to the Agency through the OEM of the vehicle subsystem. The Contractor and OEM are not obligated to provide copies of source code, as this is proprietary intellectual property; however, the Contractor is obligated to assist the Agency with any technical assistance for the duration of the life of the vehicle. It is the Agency's prerogative to evaluate the long-term viability of the Contractor and its Subcontractors and Suppliers based upon the criteria set forth in "Qualification Requirements."	1. GILLIG requests confirmation that a "separate" Software Escrow Account is not required for this procurement? We request confirmation that a separate Software Escrow Account would only be required in the case of bankruptcy of the Contractor or material breach of the Contract. 2. Paragraph 2 - we request deletion of the requirement to provide the Agency a list of all OEM software comprising proprietary works ("Proprietary Software") or all major vehicle subsystems upon execution of the Contract. GILLIG considers this information to be proprietary and the information is not available from our major subsystem suppliers. 3. GILLIG confirms we will continue to support the Agency through our Field Service Department and Warranty coverage as required in your specifications.	See Response	1. Approved 2. Approved 3. Acknowledged
72	6	Section 6, TS 88.4 COST OF OWNERSHIP	187	In addition to the Proposers submittals describing and defining the service and maintenance requirements for the equipment, a "Cost of Ownership" template has been developed and included in the forms to be filled out by the Proposer as an element of the submittal package.	COST OF OWNERSHIP template is missing from the specifications.	See Response	There was no Total Cost of Ownership form included in the RFP package. PSTA is requesting Proposer's submit information related to anticipated cost of ownership on either their own form or included as a narrative in the proposal response.
71	6	IP 14. Ordering Instructions	28	Each Procuring Agency will forward to PSTA the executed purchase order for the buses being purchased. Each purchase order will contain the pricing for any and all optional equipment and or accessories listed in the Contractor's proposal. The Contractor will promptly assign each order a tracking and control number and forward a copy of the request and purchase order to the Florida Transit Association Finance Corporation(FTAFC) for processing and invoicing of transaction fees ($500 per bus, not to exceed $10,000 per calendar year per Procuring Agency).	GILLIG requests the ordering instruction be changed to the same as is currently used for the Florida Heavy Duty Bus contract with JTA - Upon receipt of quote, review and compare against to ensure that the options and pricing are in accordance with the contract documents. All purchase orders must reference Contract RFP 21-980369 Florida Electric Transit Buses. Upon issuance and approval of your agency purchase order, send directly to the contractor. Under this contract, the contractor will be responsible for providing Florida Transit Association Finance Corporation (FTAFC) a copy of each agency's purchase order upon receipt. The contractor will also provide the FTAFC with a quarterly statement of purchases made off the contract. The FTAFC will issue an invoice to the procuring agency to pay the FTAFC a transaction fee of Five Hundred dollars (500.00) not to exceed ten thousand dollars ($10,000.00) per calendar year.	See Addendum	See Addendum for Revised Ordering Instructions
70	6	TS 5.9 Technical Service Representatives	78	The Contractor shall provide full-time, on-site technical support representative for the buses and charging and associated equipment for the first two (2) years after bus delivery, with annual renewal options for ten (10) more years	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Addendum #4 deleted the requirement of providing a full-time, on-site technical support representative for two years after bus delivery with annual renewal options for ten years. All other language in TS 5.9.1 Technical/Service Representatives still applies. Proposer shall provide sufficient information in their proposal detailing their field service support capabilities, including response times, staff levels, service centers (if applicable), for both the bus and charging equipment.
69	6	TS 88.3 Conditional Assessment	187	The Contractor shall be responsible for conducting a conditional assessment of the buses at the end of one year and three years of service life.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately as an option.
68	6	TS 89.1 Charger Maintenance Procedures	187	The Contractor shall provide a three (3) years of maintenance technical support of the charging equipment (both on-route and depot charges). This three year period shall correspond to the warranty period in start and end date as outlined in the Warranty Section. A written maintenance plan and training must be provided to the Agency prior to acceptance. The plan shall include at a minimum a 52 week preventative and scheduled maintenance and Long-term capital rehab / replacement plan for the life of the system. PSTA will use its own staff (or through the use of outside subcontractors) to provide weekly inspections as required to check fluids, drain filters and perform other similar light inspection and service as documented in the maintenance plan. Contractor shall visit the site not less frequently than once per month to perform inspections and maintenance as required. These visits must be coordinated with the Agency to ensure that there are buses that can be charged to allow operational testing. Contractor shall maintain detailed records of all inspections, calibrations, tests, maintenance and repairs. Information shall be provided to the Agency on a timely basis for storage.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately for the three (3) years of technical support as an option. However, a written maintenance plan and initial training for charging equipment shall be furnished to the agency as a contract deliverable and at no additional cost.

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67	6	TS 89.2 Maintenance Materials and Licenes	188	The Contractor shall supply all parts and consumables included within the cost of the contract. The Contractor shall maintain an inventory of all required parts including consumables and major repair parts during the terms of this contract. The Agency will pay the cost of all electric power and communications to the station. The Agency will provide insurance on the property. Contractor will provide other insurance as indicated elsewhere in this document Contractor shall keep all operating permits current. Contractor shall at their own expense provide any documentation and/or testing required and pay any fees required for these permits. Contractor shall pay any upgrade or annual license fees as required to keep all copies of software current.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately as an option.
66	6	TS 89.4 Performance Reporting	188	The Contractor shall be responsible for monitoring the performance of the charging equipment and re-porting the condition to the Agency on a monthly basis. The report should include any recommendations for improve-ments that improve the charging of the buses or reduce the overall operational costs during the duration of the contract.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately as an option.
65	6	TS 89.4 Conditional Assessment	188	The Contractor shall be responsible for conducting a conditional assessment of the charging equipment at the end of one year and three years of service life.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately as an option.
64	6	TS 90 Exportable Power Supply	189	Please describe the capabilities of the vehicle to provide power to auxiliary systems outside of the bus when stationary.	GILLIG wishes to advise that our Battery Electric Bus is not designed to power to auxiliary systems outside of the bus and therfore will not be proposed.	See Response	Acknowledged.
63	6	#3 - Agreement For Electric Transit Buses with Charing and Associated Equipment	Page 1	SCOPE OF SERVICES. Contractor, at the direction of PSTA, shall furnish to PSTA Electric Transit Buses with Charging and Associated Equipment as described in, and in accordance with the specifications, tasks, and scope of work set forth in the RFP (the "Services"), and in the amount set forth in the RFP. Contractor acknowledges that it has read the specifications and understands them. **Contractor also agrees to provide electric transit buses with charging and associated equipment to all permissible assignees of PSTA. PSTA's permissible assignees shall have the option to purchase electric transit buses and charging and associated equipment in accordance with the terms and conditions of the RFP**, and specifically SP 3of the RFP.	GILLIG requests clarification: How do you determine who is a "permissible assignee" and will PSTA athorization be required to be a permissable assignee?	See Response	1. "permissible assignee" shall mean all State agency, the legislative and judicial branches, political subdivisions, counties, school boards, community colleges, municipalities, transit authorities, special districts, or other public agencies or authorities. 2. Will PSTA authorization be required to be a permissible assignee- NO
62	6	NR 3. Proposal Due Date and Submittal Requirements	13	Proposals must be received by 10:00 am local time on Tuesday, September 21, 2021. (date changed in Addendum 5)	Request that the proposal due date be not less than three (3) weeks after receipt of responses to Requests for Pre-Offer Change or Approved Equal and/or the final Addendum. This will ensure that Offerors have sufficient time to thoroughly review any changes and secure appropriate quotes from suppliers.	See Response	Not sure if this is still applicable
61	6	SP 1.2 Pilot Bus	48	The Contractor shall produce one pilot vehicle for each type of vehicle with respect to the base order.	Request that the requirement for a pilot bus be removed as there is no clear indication of how many buses woud be purchased in the base order, or which agency would be managing the base order.	See Response	PSTA prefers to keep the language "as-written" in the RFP for the purposes that it shall apply to order quantities of two (2) or greater.
60	6	TS 5.13 Fire Suppression	80	The buses shall be equipped with a suitable means of automatically detecting and extinguishing fires and/or overtemperature situations that may cause unreliable or unsafe operation.	Please clarify whether the base bus pricing should include a Fire Suppression Sytem as there are lines for a number of different fire suppression systems on the Pricing Schedule. Note: Proterra's base design does not include Fire Suppression; however, we can add any of the options listed on the pricing schedule.	See Response	The base bus shall be equipped with a suitable fire suppression system manufacture red by Amerex, or approved equal.
59	6	TS 6.4 Step Height TS 6.4.1 Transit Coach	82	The step height shall not exceed 16.5 in. at either doorway without kneeling and shall not exceed 15.5 in. at the step. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.	Request approval for the step height to not exceed 15.7" at the front doorway and 17.1" at the rear doorway when the doors are open to passenger ingress (un-knelt) or 13" at the front doorway and 14.4" at the rear doorway when fully knelt. One of the major benefits of the Proterra ZX5 vehicle is the placement of the battery packs under the floor and between the axles. Having the batteries located in this position allows for the following benefits: Lower Center of Gravity for better handling and increased safety; no HV batteries located in the passenger compartment; and batteries mounted lower than the side impact height for automobiles.	Approved	NA
58	6	TS 6.6 Ramp Clearances	82	The breakover angle is the angle measured between two lines tangent to the front and rear tire static loaded radius and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll. 8 deg min front breakover	Request approval for a breakover angle of 7.8 degrees at ride height. Note that our bus has an over-raise feature that can be engaged while driving that increases the breakover angle up to 8.9 degrees.	Approved	NA
57	6	TS 6.8 Floor Height TS 6.8.1 Transit Coach	83	Height of the step above the street shall be no more than 16 in. measured at the centerline of the front and rear doorway. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.	Request approval for the step height to not exceed 17.1" at the rear doorway when the doors are open to passenger ingress (un-knelt) Note that rear doorway step height decreases to 14.4" when fully knelt. One of the major benefits of the Proterra ZX5 vehicle is the placement of the battery packs under the floor and between the axles. Having the batteries located in this position allows for the following benefits: Lower Center of Gravity for better handling and increased safety; no HV batteries located in the passenger compartment; and batteries mounted lower than the side impact height for automobiles.	Approved	NA
56	6	TS 7.3 Acceleration	85	The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming. The manufacturer shall supply the new performance data. The Contractor shall provide performance scans to the Agency based on the Agency's specific drivetrain configuration.	Request approval of our standard offer which includes a choice of 3 pre-configured customer selectable settings for acceleration and regenerative braking levels per the options described in Exhibit A. These settings have been optimized for ideal performance and efficiency, and we would work with the Authority to determine the best solution based on the Authority's profile and preferences.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
55	6	TS 9.1.3 Primary Propulsion Unit and Traction Motor(s)	89	The propulsion and braking systems shall meet the performance requirement of the Duty Cycle. Braking application and performance shall remain consistent regardless of the System State of Charge (SOC) or other variances related to regenerative braking. The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming. The manufacturer shall supply the new performance data. In addition to power required for propulsion, sufficient excess power shall be available to operate all accessories at their normal operating condition throughout the transit bus duty cycle.	Request approval of our standard offer which includes a choice of 3 pre-configured customer selectable settings for acceleration and regenerative braking levels per the options described in Exhibit A. These settings have been optimized for ideal performance and efficiency, and we would work with the Authority to determine the best solution based on the Authority's profile and preferences.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
54	6	TS 9.1.3 Primary Propulsion Unit and Traction Motor(s)	89	The propulsion system shall be designed so that no component operates at more than 80% of its maximum designed load, speed,, voltage or amperage. A programmable system shall be provided to limit motor speed to a safe value. Propulsion system operation, including charging of the energy storage system, shall be electronically controlled. It shall have a programmable performance control system and the latest maintenance and diagnostic software system. PSTA will be granted access to full re-programming functionality to all components of the vehicle.	Request approval of our standard offer which includes a choice of 3 pre-configured customer selectable settings for acceleration and regenerative braking levels per the options described in Exhibit A. These settings have been optimized for ideal performance and efficiency, and we would work with the Authority to determine the best solution based on the Authority's profile and preferences.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
53	6	TS 9.1.5 Propulsion System Controller (PSC)	92	The PSC regulates energy flow throughout system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (voltages, currents, temperatures, etc.) within specified operating ranges.	Request approval of our system design which does not use a Propulsion System Controller (PSC). We utilize a powertrain controller to manage the traction motor and transmission, an ESM to interface to the batteries, a charge controller for charging, and a vehicle controller to integrate the systems all together. The vehicle controller manages all power flow and ancillary load management.	Approved	NA
52	6	TS 10.1 Component Thermal Management	94	A means of determining satisfactory component coolant level shall be provided. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system with both it and the water filler no more than ±60 in. above the ground. Both shall be accessible through the same access door.	Request approval of our proposed coolant system design which does not incorporate a manual pressure relief valve. The expansion tank cap relieves pressure above 13psi. During fill, a solenoid valve opens which relieves pressure while the fill pump is running.	Approved	NA

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51	6	TS 15 Radiator	98	Radiator piping shall be stainless steel, brass tubing or painted steel rated at 1000 hours of salt spray according to ASTM B117. Where practicable, hoses shall be eliminated. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360 deg. seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.	Request approval of our standard Mubea radiator clamps. The clamps are steel and have passed a 1,000+ hour salt spray test. Please refer to Exhibit B for more information.	Approved	NA
50	6	TS 29.3.4 Kneeling	108	An indicator visible to the driver shall be illuminated until the bus is raised to a height adequate for safe street travel. An audible warning alarm will sound simultaneously with the operation of the kneeler to alert passengers and bystanders. A warning light mounted near the curbside of the front door, a minimum 2.5 in. diameter amber lens, shall be provided that will blink when the kneel feature is activated. Kneeling shall not be operational while the wheelchair ramp is deployed or in operation.	Request approval of our standard warning light which is a minimum of 1.75" diameter amber lens.	See Response	Conditional approval is granted on the basis that the 1.75" diameter lenses meet FVMSS, ADA, or any other governing body specification for use on a public transit bus.
49	6	TS 37.3 Air Lines and Fittings	115	DEFAULT • Green: Indicates primary brakes and supply. • Red: Indicates secondary brakes. • Brown: Indicates parking brake. • Yellow: Indicates compressor governor signal. • Black: Indicates accessories.	Request approval of the following color combination for air lines: • Green: Indicates primary brakes and supply • Red: Indicates secondary brakes • Brown: Indicates parking brake • Yellow: Indicates transmission and ride height controller feed (we don't have governor air lines) • Black: Indicates accessories & doors • Blue: Indicates curb side air bags • Orange: Indicates street side air bags	Approved	NA
48	6	TS 38.1 Modular Design	117	Design of the electrical, electronic and data communication systems shall be modular so that each electronic device, apparatus panel, or wiring bundle is easily separable from its interconnect by means of connectors.	Request approval of our standard multicore cable which runs from the drivetrain to the power steering motor at the front of the vehicle. It passes through 2 bulkheads and is part of a drivetrain harness. Maintaining a constant shield is important to protect other systems from Electro-Magnetic Interference. Also, reducing the number of terminations also improves the reliability of the circuit. If this cable were to be damaged and be required to be replaced, it can be done with minimal extra effort when compared to the requested design. To date, we haven't replaced this cable on any vehicle in service.	Approved	NA
47	6	TS 40.5 High Voltage Disconnect System	121	The high-voltage system shall be fitted with automatic disconnecting contactors located as closely as possible to the positive and negative battery output terminals so as to minimize the external circuitry that is not de-energized when the devices open. These contractors shall be in addition to any such devices incorporated in the motor controller, and shall not require electrical power to operate (that is, they shall be normally open when unpowered). The contactors shall be rated as capable of interrupting the maximum normally encountered charging or operating current at the highest voltage likely to be encountered (maximum charger-output voltage, or charger-input voltage, whichever is greater). Contactors shall be controlled by the "High Voltage Disconnect" switch, and any safety-critical interlocks and interlock loops, motor-controller overcurrent- protection functions, and vehicle crash and/or fire sensors. Reset of the contactors shall require the deliberate action of the operator or maintenance personnel. Contactors should provide a visual or electrical indication of their status (open or closed) or of a failure to function.	Request approval of our standard design high voltage disconnect system which operates as follows: - Our system utilizes redundant contactors. One set in each battery pack and another set in the main HV junction box. - A separate HV disconnect is a physical disconnect and doesn't go through the contactors. - The contactors are controlled by the BMS and vehicle controller with a number of different conditions that can disable them.	See Response	Please submit further explanation as part of your proposal for review by the evaluation committee.
46	6	TS 41.1.2 Shielding	125	All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However, certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable. NOTE: A shield grounded at both end forms a ground loop, which can cause intermittent loss of control or faults. When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.	Request approval of our standard design which has some shields that are grounded at both ends per the component manufactures installation instructions (i.e. power cables between the motor and Inverter)	See Response	Please submit further explanation as part of your proposal for review by the evaluation committee.
45	6	TS 44.5 Normal Bus Operation Instrumentation and Controls	129	The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the operator. The operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.	Request that the instrumentation and controls listed be noted as representative only and that the final layout of instrumentation and controls be agreed upon in the pre-production meeting(s).	See Response	Proposer's may specify whichever dash layout is inherent to the design of the bus.
44	6	TS 44.6.1 Pedal Angle	133	The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 37 to 50 deg at the point of initiation of contact and extend downward to an angle of 10 to 18 deg at full throttle. The location of the brake and accelerator pedals shall be determined by the manufacturer, based on space needs, visibility, lower edge of windshield and vertical H-point.	Request approval for the pedal angles to be as follows: -Accelerator pedal 45° at initiation and 25° at full throttle -Brake pedal 45° at initiation and 25° at full brake	Approved	NA
43	6	TS 47.7.1 Exterior Mirrors	138	The bus shall be equipped with corrosion-resistant, outside rearview mirrors mounted with stable supports to minimize vibration. Mirrors shall be firmly attached to the bus to minimize vibration and to prevent loss of adjustment with a breakaway mounting system. Mirrors shall permit the driver to view the roadway along the sides of the bus, including the rear wheels. Mirrors should be positioned to prevent blind spots.	Request approval of our standard exterior mirrors as described in Exhibit C. Please note that additional options and sizing on the Price Sheet are not available on Proterra buses.	See Response	Proposer's may specify whichever mirrors are inherent to the design of the bus.
42	6	TS 49.1 Glazing	140	Shaded Band The upper portion of the windshield above the driver's field of view shall have a dark, shaded band and marked AS-3, with a minimum luminous transmittance of 5 percent when tested in accordance to ASTM D1003.	Request approval for our standard windshield design which does not have a shaded band as our overhead panel is fairly low and a shaded band may interfere with mirror visibility. Proterra could apply a tint film with 5% LT that sits just below the blackout on the street side of the windshield.	Approved	NA
41	6	TS 50 Driver's Side Window	140	The driver's side window shall be the sliding type, requiring only the rear half of the sash to latch upon closing, and shall open sufficiently to permit the seated operator to easily adjust the street-side outside rearview mirror. When in an open position, the window shall not rattle or close during braking. This window section shall slide in tracks or channels designed to last the service life of the bus. The operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single-density tint.	Request approval for our standard driver's side window which is hidden frame and non-egress as described in Exhibit D. Please note that traditional framed windows, full slider, and egress driver's side windows are not available on Proterra buses.	See Response	Proposer's may specify whichever windows are inherent to the design of the bus.
40	6	TS 50 Driver's Side Window	140	The driver's view, perpendicular through the operator's side window glazing, should extend a minimum of 33 in. (840 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 26 in. (560 mm) above the operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.	Request approval for our standard driver's side window which allows the view through the glazing at the front of the assembly beginning not more than 27.2 in. above the operator's floor.	Approved	NA
39	6	TS 51 Side Windows TS 51.1 Configuration	141	Side windows shall not be bonded in place, but shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. All aluminum and steel material will be treated to prevent corrosion.	Request approval of our standard passenger windows which are flush and not bonded; however, our design incorporates a quarter window just ahead of the front entrance door which is bonded in place.	See Response	Proposer's may specify whichever windows are inherent to the design of the bus.
38	6	TS 51 Side Windows	142	Default and Alternative Configurations	Request approval for Proterra's streamlined body design which exclusively uses hidden frame side windows. Please note that traditional framed windows are not available on Proterra buses.	See Response	Proposer's may specify whichever windows are inherent to the design of the bus.

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37	6	TS 54.3 Controls for the Climate Control System (CCS)	146	The controls for the driver's compartment for heating, ventilation and cooling systems shall be integrated and shall meet the following requirements: • The heat/defrost system fan shall be controlled by a separate switch that has an "off" position and at least two positions for speed control. All switches and controls shall preclude the possibility of clothing becoming entangled, and shields shall be provided, if required. If the fans are approved by the Agency, an "on/off" switch shall be located to the right of or near the main defroster switch. • A manually operated control valve shall control the coolant flow through the heater core. • If a cable-operated manual control valve is used, then the cable length shall be kept to a minimum to reduce cable seizing. Heater water control valves shall be "positive" type, closed or open. The method of operating remote valves shall require the concurrence of the Agency project manager.	Request approval for our standard design which does not require a manually operated control valve because the heater is electrical and does not use heated water.	See Response	Proposer's may specify whichever system/controls method is inherent to the design of the bus.
36	6	TS 54.4 Driver's Compartment Requirements	147	A ventilation system shall be provided to ensure driver comfort and shall be capable of providing fresh air in both the foot and head areas. Vents shall be controllable by the driver from the normal driving position. Decals shall be provided, indicating "operating instructions" and "open" and "closed" positions. When closed, vents shall be sealed to prevent the migration of water or air into the bus.	Request approval for our standard design which does not have provisions to provide fresh-air (exterior air) to the driver's area.	See Response	Please submit further explanation as part of your proposal for review by the evaluation committee.
35	6	TS 57 Maintainability	148	DEFAULT High and low refrigerant pressure electronic gauges to be located in the return air area.	Request approval for our standard design which does not incorporate remote "mechanical" gauges and has no provisions for them. The high and low pressures can be viewed through an unlocked service screen on our HVAC controller. Also, the high and low pressure are on the CAN messages and are visible through the service tool.	Approved	NA
34	6	TS 62 Repair and Replacement TS 62.1 Side Body Panels (Transit Coach)	149	Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired in lengths not greater than 12.5 ft.	Request approval for our standard bus design which uses a composite, monocoque body that does not have exterior paneling. The outer skin is integral to the body structure. When damage occurs to the exterior of the vehicle, the repair is contained to just the damaged area. The side body from floor to window is repairable with common composite repair techniques. The body is also covered with a gel coat that resists chips and cracks.	Approved	NA
33	6	TS 67.1 Access Doors (Transit Coach)	150	Access openings shall be sized for easy performance of tasks within the compartment, including tool operating space. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. All access doors shall be retained in the open position by props or counterbalancing with overcenter or gas-filled springs with safety props and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems. If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.	Request approval for our standard design which has lower side access doors for the motor compartment that, when opened, restrict access to the upper side access doors. All other access doors, when opened, do not restrict access for servicing other components or systems. Please see Exhibit E for additional details.	See Response	Approval is granted that your standard design which has lower side access doors for the motor compartment that, when opened, restricts access to the upper side access doors. However, upon review of the pictures contained in your Exhibit E—Access Panels, it appears that the lower panel's right hand door support strut would need to be removed into order to pull the 12/24 V battery tray out. Please confirm.
32	6	TS 69.1 Appearance	152	All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system Supplier prior to application of paint to ensure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting, where possible, to prevent corrosion. The bus shall be painted prior to installation of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.	Request approval for the base white color of the bus body to be gelcoat rather than paint. The gelcoat is inherent to the composite body construction and is resistant to chips and cracks. Please note that due to Proterra's design with hidden frame windows, black masking at the windows is not applicable.	Approved	NA
31	6	TS 73.19 Farebox/Card Reader Lighting TS 73.19.1 Transit Coach	160	ALTERNATIVE (TRANSIT COACH) Provide a farebox and card reader light.	Please clarify whether farebox and card reader lights are part of the base bus or an option. If the intent is for these to be an option, please add a line item to the Pricing Schedule.	See Response	It is part of the base bus.
30	6	TS 76.15 Construction and Materials (Transit Coach)		Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners. Coloring shall be consistent throughout the seat material, with no visually exposed portion painted. Any exposed metal touching the sides or the floor of the bus shall be stainless steel. The seat, pads and cushions shall be contoured for individuality, lateral support and maximum comfort and shall fit the framework to reduce exposed edges. The minimum radius of any part of the seat back, handhold or modesty panel in the head or chest impact zone shall be a nominal ¼	Request approval of our standard seats which are bolted into the body with hex bolts and locknuts onto tee bolts with the seat rail. The seats themselves are built with tamper-resistant fasteners.	Approved	NA
29	6	TS 78.5 Door Glazing	170	Door glazing shall be easily replaceable.	Request approval for our standard Ventura door glazing replacement procedures as defined in Exhibit F.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
28	6	TS 78.9 Actuators	171	If powered by compressed air, exhaust from the door system shall be routed below the floor of the bus to prevent accumulation of any oil that may be present in the air system and to muffle sound.	Request approval of our standard design in which the exhaust from the door system is not routed below the floor of the bus. It exits through a muffler on the valve block of the actuator mechanism. Oil in the air lines is separated out by an individual air filter for each door.	Approved	NA
27	6	TS 85 Electronics/Equipment Compartment	180	Each bus shall be equipped a fully sealed compartment located on the left front wheelhouse to provide a mounting location for radio equipment, video recording equipment, APC equipment and other electronic equipment. The compartment shall be lockable, completely water resistant and of steel construction. It shall be accessible from inside the bus, shall have 3 slide trays that automatically lock into place for easy maintenance of the equipment. The compartment shall be water resistant when the service door is secured. The compartment shall be supplied with power and ground circuit requirements.	Request approval for our standard ITS storage box which is located on the street-side wheel housing. Please note that our storage box is designed to provide sufficient access to customer ITS-related equipment as shown in Exhibit G.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
26	6	TS 87 Charging System Specifications	182	The chargers shall be equipped with an submeter that: Measures and displays kWh consumed and real time load in KW within 1% accuracy; Is capable of RS-485 communications; and Records kWh and kVARh delivered, kWh and kVARh received.	Can the submetering be handled by an external device, or must it be part of the charger?	See Response	It can be either an external device or part of the charger.
25	6	TS 87.1 "In-Shop" and/or "Depot Charger"	183	The bus mounted receptacle shall be of simple and ergonomic design, of not more than 25 pounds (plug and cord), not more than two plugs, and heavy-duty construction, and shall not be energized except when mated with the charger connectors.	Is there a minimum cable length required?	See Response	No. Proposer shall state what their standard length offering is along with whether custom lengths are available.
24	6	S-10 Pricing Schedule	N/A	Entire Form	Please clarify that it is not mandatory to quote every line item listed as some line items are not available on Proterra Electric Buses.	See Response	It is not mandatory to quote every line item. For those items not quoted please mark as "No Quote".
23	6	S-10 Pricing Schedule	N/A	Destination Signs	Per Addendum 1 (through 4), the base buses should include destination signs on the front and side; the rear sign is listed as an alternative. The Pricing Schedule lists standalone options for 126 Luminator Rear View Camera Integrated into Rear LED sign; and Luminator--Delete Rear Sign. Neither of those would be appropriate if the base buses do not include a rear sign.	See Response	The base bus shall be furnished with a front and right side (curbside) destination sign, Luminator Smart Series III with white LED, or approved equal. A rear sign may be quoted as optional equipment. Being said, the call-out Luminator--Delete Rear sign is not applicable and should be disregarded.

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22	4	TS 7.4	85	**TS 7.4 Operating Range** The operating range of the coach shall be designed to meet the operating profile as stated in the "Design Operating Profile" section. The operating range of the coach on a single battery charge shall be designed to meet the following targeted ranges per the operating profiles as stated in the "Design Operating Profile" section.	Will PSTA specify the minimum operating range requirement?	See Response	There are no minimum range requirement specifications established in this RFP. As stated in the RFP and during the pre-proposal meeting Proposers shall supply the range information requested in TS 8.1 for each size bus being submitted for consideration utilizing the Altoona On-Road Energy Consumption and Range Tests for buses. Specifically, CBD, ART, and COM Duty Cycles.
21	4	TS 7.3	85	**TS 7.3 Acceleration** Braking application and performance shall remain consistent regardless of system state of charge (SOC) or other variances related to regenerative braking.	We would like to clarify that electric bus is equipped with two braking systems to decelerate the bus. One is a pneumatic friction-based brake system, and another is a regenerative braking system. The braking performance is different with and without regenerative braking. Regenerative braking is availiable(braking performance is consistent) regardless of system SOC in our design. While, if the regenerative braking is limited or not availiable due to special condition, the braking performance is different. We request approval of the design.	Approved	NA
20	4	TS 8.2	87	**TS 8.2 Design Operating Profile (Battery Electric Bus)** Supply a performance summary for the exact bus(es) to be built, utilizing a 130% passenger load. Data to show AT LEAST the following: time to speed on flat ground, 5%, 7%, 10% and maximum grade for speeds of 5, 10, 15, 25, 35 mph (or maximum for each grade).	We would like clarity that as opearaing range varies with road conditions, wheather, bus configuration, driver behavior etc., We request the agency to provide a detail ruote profile data(including bus speed vs time, route grades vs bus speed, preferably at a sampling frequency of 1 Hz or greater)	See Response	Detailed route data is not available. As stated in the RFP and during the pre-proposal meeting Proposers shall supply the range information requested in TS 8.1 for each size bus being submitted for consideration utilizing the Altoona On-Road Energy Consumption and Range Tests for buses. Specifically, CBD, ART, and COM Duty Cycles. Assume ambient temperature of 90 deg F and weather customary to the State of Florida.
19	4	TS 8.2	87	**TS 8.2 Design Operating Profile (Battery Electric Bus)** Supply a performance summary for the exact bus(es) to be built, utilizing a 130% passenger load. Data to show AT LEAST the following: time to speed on flat ground, 5%, 7%, 10% and maximum grade for speeds of 5, 10, 15, 25, 35 mph (or maximum for each grade).	If detail route profile data is not available, We request approval to provide Altoona cycle operaing range for reference.	See Response	See answers to previous questions.
18	4	TS 9.1.4	90	**TS 9.1.4 Energy Storage System and Controller** **Energy Storage System** A phased automatic shutdown system shall be provided	We would like PSTA to clairify the "A phased automatic shutdown system". What is the function? How does it work?	See Response	The intent of the specification is that sufficient warnings will be given to the operator that the SOC is running low. The intent of a "phase automatic shutdown" is, as an example, at 30% SOC a warning indicator, audible tone, is given, at 20% SOC the bus may derate in performance to conserve energy, at 10% SOC the bus goes into "limp-home" mode, at 0% the bus automatically shuts down. The levels of SOC stated previously are only used to illustrate the intent. Proposers shall specify what form of low-SOC shutdown protocols are in use.
17	4	TS 9.1.4	92	**TS 9.1.4 Energy Storage System and Controller** **Energy Storage System** **Battery Charging** The bus shall support an SAE-approved charging standard (SAE J3068 AC and/or SAE J1772 DC).	Will PSTA accept our AC charging as an option? Our AC chagring has SAE J-3068 connector but not fully compliant to SAE J-3068.	See Response	Manufacturer shall provide a detailed description of its charging system and specify its compliance with one of the listed standards. If the charging system cannot meet compliance provide detailed information as part of the Proposal so that the Evaluation Committee may review and make a determination on acceptance.
16	4	TS 9.1.6	93	**TS 9.1.6 Hybrid System Controller (HSC)** The HSC regulates energy flow throughout hybrid system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (e.g., voltages, currents, temperatures, etc.) within specified operating ranges.	We requests to delete this requirement as the RFP is for electric bus.	See Response	If the specification does not apply to a manufacturer's bus design the Proposer may consider it not applicable.
15	4	TS 19	99	**TS 19. Altoona Testing** **DEFAULT** An Altoona Test Report shall be provided to the Agency with the Proposal submittal.	Will PSTA accept to provide altoona report prior to first bus delivery? And FTA does allow for test to be accepted upon delivery of the first bus.	See Response	The bus will need to satisfy meeting FTA Pre Award, Post delivery and FAST Act requirements.
14	4	TS 26.5	103	**TS 26.5 Construction** Plywood shall be certified at the time of manufacturing by an industry-approved third-party inspection agency such as APA – The Engineered Wood Association (formerly the American Plywood Association).	We would like clarity that the standard floor is Coosa Composite fiberglass composite floor. Coosa fiberglass composite floor can meet both FMVSS 302 and docekt 90 requirement. And it is also Altoona tested in our bus. We requests approval of Coosa fiberglass floor.	Approved	NA
13	4	TS 56	148	**TS 56. Roof Ventilators** **ALTERNATIVE** Three Roof Ventilators (Used in articulated buses.)	Will PSTA accept two roof ventilators in articulated bus?	See Response	Yes, so long as number of ventilators satisfies compliance with FMVSS for minimum number of escape hatches.
12	4	TS 52	144	**TS 52. Capacity and Performance** **ALTERNATIVE** R134a The air conditioning system shall meet these performance requirements using R134a	R410a has a greater efficiency,lower price than R134a. Also R410a is more friendly to environment. We request approval for OUR HAVC which uses R410a for the system.	Approved	NA

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<tr><td>11</td><td>4</td><td>TS 78.1.2</td><td>168</td><td>TS 78.1.2 Rear Door(s)

In cases where street-side and curbside doors are chosen, provisions shall be made for operating the front door, curbside rear door(s) and street-side rear door(s) independently or in the combinations shown in Table 7 while providing positive tactile feedback to the operator identifying the door control selection.

TABLE 7
Door Operating Combinations
<table><tr><th>Front</th><th>Curbside Rear</th><th>Street-Side Rear</th></tr><tr><td>Closed</td><td>Closed</td><td>Closed</td></tr><tr><td>Open</td><td>Closed</td><td>Closed</td></tr><tr><td>Open</td><td>Open</td><td>Closed</td></tr><tr><td>Open</td><td>Closed</td><td>Open</td></tr><tr><td>Open</td><td>Open</td><td>Open</td></tr><tr><td>Closed</td><td>Open</td><td>Closed</td></tr><tr><td>Closed</td><td>Closed</td><td>Open</td></tr><tr><td>Closed</td><td>Open</td><td>Open</td></tr></table></td><td>Does PSTA need one front door, one curbside rear door and one street-side rear door in articulated bus? If not, please specify door number and door location.</td><td>See Response</td><td>Disregard all references to "street-side" doors for articulated bus in this RFP. The doors being specified will be curbside only, mounted in the standard manufacturer locations.</td></tr>
<tr><td>10</td><td>4</td><td>TS 5.9.1</td><td>78</td><td>TS 5.9.1 Technical/Service Representatives

The Contractor shall, at its own expense, have one or more competent technical service representatives available on request to assist the Agency in the solution of engineering or design problems within the scope of Services and the specifications that may arise during the warranty period. This does not relieve the Contractor
of responsibilities under the provisions of “Section 7: Warranty Requirements.”

The Contractor shall provide full-time, on-site technical support representative for the buses and charging and
associated equipment for the first two (2) years after bus delivery, with annual renewal options for ten (10)
more years.</td><td>Proponent requests that requirement for full-time on-site technical support representatives for two years and beyond be removed as this will be cost prohibitive.

Proponent has technical support staff for the bus that can provide solutions remotely or a technician in a service truck could be dispatched within 24-48 hours. Technical service for chargers also would be remote and an on-site representative could be provided within 24-48 hours.

We request your approval.</td><td>See Response</td><td>PSTA approves of the request to delete the requirement of providing a full-time, on-site technical support representative for two years after bus delivery with annual renewal options for ten years.

All other language in TS 5.9.1 Technical/Service Representatives still applies.

Proposer shall provide sufficient information in their proposal detailing their field service support capabilities, including response times, staff levels, service centers (if applicable), for both the bus and charging equipment.</td></tr>
<tr><td>9</td><td>3</td><td>SP 2.4</td><td>51-53</td><td>SP 2.4 Contract Deliverables
Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with “Section 6: Technical Specifications.” Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.</td><td>We request clarification regarding the quantities of manuals needed. Please clarify which section prevails between Table 1: Contract deliverables and SP 5.2 Documentation.</td><td>See Addendum</td><td>Revised Table 1—Contract Deliverables attached.

</td></tr>
<tr><td>8</td><td>3</td><td>SP 2.4</td><td>51</td><td>SP 2.4 Contract Deliverables
Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with “Section 6: Technical Specifications.” Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.</td><td>As per item 18 of Table 1, we understand that the City requests 20 bus orientation video. We propose to offer PSTA the right to film the on-site orientation training which includes a tour of the bus for future internal use.</td><td>Approved</td><td>NA</td></tr>
<tr><td>7</td><td>3</td><td>SP 2.5</td><td>54</td><td>SP 5.2 Documentation
The Contractor shall provide an electronic copy and three (3) printed current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy and three (3) printed current parts manual(s), and an electronic copy and three (3) printed standard operator’s manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator’s manuals and parts books up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.</td><td>There are incoherencies between the two section regarding the documentation specifications and Nova Bus would like to offer the best service according to the real needs of PSTA.</td><td>See Response</td><td>Revised SP 5.2 Documentation: The Contractor shall provide an electronic of current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy of current parts manual(s), and an electronic copy of standard operator’s manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator’s manuals and parts manuals up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.</td></tr>
<tr><td>6</td><td>2</td><td>TS 84.1 Camera Surveillance System</td><td>179</td><td>Provide all wiring and mounting locations for a multi-camera surveillance system, including the installation of cameras, recorder, microphone, etc..</td><td>Proposer requests information on whether or not a camera system should be included in the base bus price. Currently, various information pertinent to details of this system such as supplier, number of cameras, type of DVR and functionalities are missing from the technical specifications. Such information is essential to be able to provide
accurate pricing and configuration. In light of this, proposer requests approval to provide price of such systems only through optional itemsincluded in CER 6. Pricing Schedule</td><td>See Response</td><td>DEFAULT
No camera system.
ALTERNATIVE
A camera system shall be installed. Agency to select from list of available camera systems from OEM options list including installation locations.
ALTERNATIVE
Pre-wire only. Agency may select to have vehicle pre-wired only for a camera system.</td></tr>
<tr><td>5</td><td>2</td><td>CER 6. Pricing Schedule</td><td>NA</td><td>NA</td><td>The specification of several systems such as Destination signs, Camera Systems, and Automatic Passenger Counters are missing configuration details that are essential for costing. Proposer understands that the its base bus configuration will not have any of such systems, but optional pricing for those will be provided via CER 6. Pricing Schedule for interested agencies. Please confirm our understanding.</td><td>See Addendum</td><td>Pricing Scheduled has be updated</td></tr>
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4	2	TS 81 Destination Signs	177	A destination sign system shall be furnished on the front, on the right side near the front door. Route sign on the rear of the vehicle. All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver. The driver shall be able to access the sign while seated. The destination sign compartments shall meet the following minimum requirements: Compartments shall be designed to prevent condensation and entry of moisture and dirt. Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself. Access shall be provided to allow cleaning of inside compartment window and unit glazing. The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide. Run number sign shall be installed.	NA	RFP Update	**DEFAULT** A destination sign shall be furnished on the front and on the right side (curbside) near the front door. The destination signs shall be Luminator Smart Series III with white LED, or approved equal. **ALTERNATIVE** Agency to select from list of available destination sign systems from OEM provided options list. **ALTERNATIVE** A rear route sign, if available, shall be installed on the rear of the vehicle. **ALTERNATIVE** A run number sign, if available, shall be installed on the vehicle
3	2	TS 84.3 Automatic Passenger Counters (APC)	179	**ALTERNATIVE** An infrared APC system shall be installed. Agency to provide details of APC system, including installation locations and number of buses to be equipped.	NA	RFP Update	**DEFAULT** No automatic passenger counter system. **ALTERNATIVE** An automatic passenger counter system shall be installed. Agency to select from list of available automatic passenger counter systems from OEM options list including installation
2	2	TS 84.4.2 Handset	180	Contractor will install a handset for driver use.	NA	RFP Update	No handset. **ALTERNATIVE** A handset for driver use shall be installed. Agency to select from list of available handsets including installation location from OEM option list.
1	2	TS 86. Computer Assisted Dispatching System (CAD/AVL)	181	There will be a requirement to furnish and install a complete automatic vehicle locating (AVL), computer assisted dispatching system as part of this proposal. The equipment provided and installed shall be manufactured and provided by Clever Devices. Each PSTA bus is equipped with various components provided by Clever Devices to include all necessary wiring and software installation. The on board computing processer unit- IVN4 is the central processing unit for each revenue service vehicle in the PSTA fleet. Along with the IVN4 each bus has an interactive Mobile Data Terminal (MDT) which Clever Devices references as a Transit Control Head (TCH). This equipment is interfaced with the bus radio, destination signs, and fare boxes to provide a central "Single Point Logon." All data is transmitted through a cellular network. Clever Devices also provides to PSTA an Automatic Vehicle Monitoring System (AVM-3) for each individual bus controlled by a central networking system. This interface monitors the major vehicle components and generates automatic reports through our Wireless Access Points (file dumping) and real-time monitoring via a cellular network.	NA	RFP Update	**DEFAULT** No computer assisted dispatching system (CAD/AVL). **ALTERNATIVE** A computer assisted dispatching system (CAD/AVL) shall be installed. Agency to select from list of available CAD/AVL systems from OEM options list including installation requirements and configuration. **ALTERNATIVE** Pre-wire only. Agency may select to have vehicle pre-wired only for a CAD/AVL system.

Revised Ordering Instructions

Each Procuring Agency will forward to PSTA and the Florida Transit Association Finance Corporation (FTAFC) the executed purchase order for the buses being purchased. Each purchase order will contain the pricing for any and all optional equipment and or accessories listed in the Contractor's proposal. Once the purchase order is received by the FTAFC, the FTAFC will invoice a transaction fee of $500 per bus (not to exceed $10,000 per calendar year per Procuring Agency) for an in-state Procuring Agency and a transaction fee of $1,000 per bus for an out-of-state Procuring Agency (not to exceed $10,000 per calendar year per Procuring Agency).

NOTE: Transaction Fee will be paid directly from the Procuring Agency to the FTAFC.

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)
ST. PETERSBURG, FLORIDA

ADDENDUM OF SOLICITATION

1. SOLICITATION NO.:	2. ADDENDUM NO.:	3. EFFECTIVE DATE:	4. BRIEF SOLICITATION DESCRIPTION:
RFP 21-980369	7	September 15, 2021	FLORIDA ELECTRIC TRANSIT BUSES

5. REVISED OFFER SUBMISSION DUE DATE AND TIME:
(*Note: Unless identified below, this solicitation Addendum does not change the Offer Submission Date and Time.)*

The date and/or time specified for receipt of offers is changed as follows: **DATE:**

TIME:

6. REVISED PRE-BID/PROPOSAL CONFERENCE:
(Note: Unless identified below, this solicitation Addendum does not change the Pre-Bid/Proposal Conference, if a conference is scheduled.)

The scheduled pre-bid/proposal conference is changed as follows: **DATE:**

TIME: AM/PM Local

LOCATION:

7. ADDENDUM OF SOLICITATION:
The Solicitation identified in Block 1, above, is hereby amended as described in Block 11, below. Except as provided herein, all other provisions of the solicitation, or as heretofore amended, remain unchanged and in full force and effect.

8. REQUIREMENT TO ACKNOWLEDGE ADDENDUM:
Offerors must acknowledge receipt of this Addendum prior to the deadline specified in the solicitation for receipt of offers by one of the following methods:

a. Shall acknowledge the receipt of each individual addendum in their Proposals on the form Acknowledgement of Addenda.

WARNING: Failure of an Offeror to acknowledge receipt of this Addendum, as described herein, may result in REJECTION OF THE OFFER.

***NOTE**: For Invitations for Bids the terms "Offer" and Offeror" shall mean "Bid" and "Bidder", respectively; and for Requests for Proposals or Quotation the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.*

9. FOR FURTHER INFORMATION CALL CONTRACTS SPECIALIST:

Name: Alvin Burns **Email:** aburns@psta.net **(cc:** erandle@psta.net**)**

10. DESCRIPTION OF ADDENDUM:

1. Vendor Questions and the Authority's Responses.
2. Request for Pre-Offer Change or Approved Equal & RFP Updates
3. Revision #2 Ordering Instruction
4. Contract Update – Section 4 **EFFECTIVE DATE AND TERM OF AGREEMENT**

	Amendment	VENDOR QUESTION	PSTA RESPONSE
23	**7**	What is the anticipated award date/NTP? Bidder will need it as the start date of delivery schedule	PSTA intends on taking this to our October 27, 2021 Board of Directors meeting for approval
22	**7**	Since this procurement is not from one specific model or number of buses to be delivered. Please advise how this requirement should be provided?	Quantity is one (1) see pricing schedule
21	**7**	Req: Proposer's ability to secure financial guarantees, if required, as evidenced by a letter of commitment from an underwriter, surety or other guarantor confirming that the Proposer can provide the required guarantee. Since this RFP does not have a stated value is there a specific value that PSTA will accept such as a letter of bondability for certain amount to satisfy this requirement?	There is no requirement that this be bonded, however PSTA will do it's due diligence to make sure that a company is financially stable to provided the goods and services required under this solicitation.
20	4	Requests approval to limit the liquidated damages to be capped on a per bus basis at 2% of the value of the bus price. The timely performance of the work by the Contractor is of utmost importance to ensure successful completion of the deliveries stipulated in the Contract. Nonetheless, an unlimited liability obligation creates a severe restriction on our ability to disclose financial provision in accordance with Securities Exchange requirements. Hence, the Contractor considers that liquidated damages should be an assessment of direct damages suffered by the Customer, and, in addition be a mechanism to dissuade poor performance.	PSTA is agreeable to the 2% limit provided it does not exceed 80 days. In the event the delivery exceeds 80 days, the contractor would be agreeable to pay $200.00 per day not to exceed 10% of the cost of the vehicle.
19	4	Th Payment due date for purchase of goods or services other than construction services is net forty-five (45) days from the accepted date. We requested approval to reduce the net forty-five days to net thirty days from the accepted date.	As this is a procurement for the state we are bound by Florida statue 218.74.Unfortuantly we have to deny this request.
18	4	Shall bidder provide production schedule for each model based on (1) unit of vehicle? If the proposed schedule is identical for each model, can bidder provide one schedule that covers all models?	Yes
17	4	What is the qty needed for each model(s) for this RFP? A quantity will assist us in meeting providing PSTA the required delivery schedule.	This is a state schedule that may be used by any agency All quantities should be based on the assumption of one
16	4	Does this procurement require any bonds and if so for how much and for how long as well as how will the bond be released.	No
15	4	Section 3 - Qualification Section Requirements does not have this requirement. Please confirm if a letter from a suerty is required.	There is no Bonding requirement for this solicitation
14	4	Will PSTA accept the accord certificate to meet this requirement?	No. We need the letter because PSTA is not the only agency purchasing off of this contract. The submittal of the letter is a matter of responsiveness.
13	4	#12 Performance Bond. - Please confirm if a performance bond will be required as our surety as advised of the following language: See FTA language as provided by the Surety: The FTA's own website (https://www.transit.dot.gov/funding/procurement/third-party-procurement/bonds) specifically mentions that bonds are not required for Rolling Stock (i.e. buses): "The FTA requirements regarding bonds pertain only to construction contracts and facility improvement contracts. They do not pertain to contracts for equipment, rolling stock, maintenance, or other non-construction services. Grantees may choose to require bonds from contractors performing other non-construction contracts, but this is at the sole discretion of the grantee. FTA bonding requirements are discussed in FTA Circular 4220.1F, Chapter IV, 2.i. and the Best Practices Procurement Manual, Section 3.2.8 – Bonding. (Revised: May 2017)". Rolling Stock is defined as "transit vehicles such as buses, vans, cars, railcars, locomotives, trolley cars and buses, and ferry boats, as well as vehicles used for support services." Source: (https://www.transit.dot.gov/funding/procurement/third-party-procurement/definition-rolling-stock).	There is no Bonding requirement for this solicitation
12	4	Will PSTA accept a link instead of the complete annual reports as this will increase the size o the file upload. Req: 2. A copy of the three (3) most recent audited financial statements or a statement from the Proposer regarding how financial information may be reviewed by the Agency.	Yes a link is ok to submit

11	4	Will PSTA accept an accord insurance certificate in lieu of #3. Letter for insurance?	No. We need the letter because PSTA is not the only agency purchasing off of this contract. The submittal of the letter is a matter of responsiveness.
10	4	In package 3 Qualification are the following required as it states if applicable and we cannot determine if they are applicable and required as part of our submission. 4. Letter for performance bond (if applicable) 5. Letter of commitment for parental financial guarantee (if applicable)	No letter for performance bond is needed
9	2	In the RFP under TS 19. Altoona Testing it states the following... The vehicle must have completed any FTA-required Altoona testing. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure that any and all such failures will not occur shall be submitted to the Agency. DEFAULT An Altoona Test Report shall be provided to the Agency with the Proposal submittal. Buses which have not successfully completed an Altoona Test for the type and sizes requested under this RFP will not be considered. **The Proposer would like to confirm that an Altoona Test Report is required at time of submission?**	Please see addendum 1, question #3
8	2	Can the Proposer submit additional unit pricing options to supply charger accessories, as well as corrective and preventative maintenance plans, in addition to charger hardware supply?	Yes
7	2	Can sequential charging be proposed, in lieu of simultaneous charging ? In many, if not most instances, sequential charging will meet the fleet's recharging needs.	Please clarify what you are define as sequential charging and simultaneous charging
6	2	Can the Proposer submit multiple equipment model options for depot chargers ? In order to best accommodate fleet operators needs, we believe it is important to provide a larger range of chargers capable of various power levels.	Yes. As long as supporting documentation is included in your proposal
5	2	Is there a desired kW power level for the Depot Charger ?	No
4	1	Will the agency allow the submission of question using an excel spreadsheet instead of using CER 2. Request for Pre-Offer Change or Approved Equal, which can facilitate response. Please advise.	Yes
3	1	As seen in section TS 19. Altoona Testing, it states *"Buses which have not successfully completed an Altoona Test for the type and sizes requested under this RFP will not be considered."* Please confirm if a proposal will be considered if Altoona testing is to be completed after the proposal submission, and tests from our current similar models are provided in our proposal.	The bus will need to satisfy meeting FTA Pre Award, Post delivery and FAST Act requirements.
2	1	Can you confirm if charger design and installation is being requested from this RFP?	No
1	1	Will this procurement cover the design & installation of chargers?	No

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98	**7**	Section 4 SPECIAL PROVISIONS & CER 6 Pricinig Schedule	53 & 216	NR 1. Description of the Work to be Done - The Pinellas Suncoast Transit Authority (the Agency or PSTA) is requesting proposals for the manufacture and delivery of Electric Transit Buses with charging and associated equipment as a Purchase Schedule for the State of Florida , and in accordance with the terms and conditions set forth in this Solicitation. The Contract shall be a firm-fixed-price Contract. CER 6. Pricing Schedule	GILLIG wishes to advise that under the FTA Fast Act, Section 3019, Innovative Procurements; Cooperative Procurement Schedules may be for an initial term of not more then 2 years and may include not more then 3 optional extensions for terms of not more than 1 year each and may be in effect for a total period of not more then 5 years. In order to best serve the interest of Procuring agencies, and to assist in properly determining and comparing the base bus price for this procurement. GILLIG is requesting the price evaluation be based on the base bus price (not including any options) in year 1 of the contract. GILLIG also requests pricing be fixed for the first year of the contract and recommend the use of the FTA approved Producer's Price Index (PPI) for Truck and Bus Bodies 1413 for optional years 2-5.	See Response	Contract Term has been upodated see revised contract clause #3
97	6	SP 2.4 Contract Deliverables	51	**SP 2.4 Contract Deliverables** Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.	Table 1, Line 12, lists the Performance Bond as an item to be reviewed 30 days following contract execution. There does not seem to be any actual requirement for a performance bond in the RFP documents. Respectfully request that line 12 on the Contract Deliverables Table be removed or noted as not applicable.	See Response	Table 1, Line 12 is not applicable
96	6	TS 5.9.1	78	**TS 5.9.1 Technical/Service Representatives** The Contractor shall, at its own expense, have one or more competent technical service representatives available on request to assist the Agency in the solution of engineering or design problems within the scope of Services and the specifications that may arise during the warranty period. This does not relieve the Contractor of responsibilities under the provisions of "Section 7: Warranty Requirements." The Contractor shall provide full-time, on-site technical support representative for the buses and charging and associated equipment for the first two (2) years after bus delivery, with annual renewal options for ten (10) more years.	In reference to section TS 5.9.1 Technical/Service Representatives, we respectfully request clarification on how cost can be captured on a per bus basis for full-time, on-site technical support representatives for two (2) years. If multiple agencies have the ability to order buses, or even a single bus, the way this is written seems to indicate that the Contractor would have to deploy a full-time support representative to each and every customer location, each for a minimum of two years. Based on the above considerations, we respectfully request that this requirement be removed.	See Addendum	See Aaddendum 4 Question #10
95	6	TS 88.4	187	**TS 88.4 Cost of Ownership** The Agency is interested in the long term cost of ownership, particularly the maintenance requirements that are routine, scheduled and/or reasonably predictable. In addition to the Proposers submittals describing and defining the service and maintenance requirements for the equipment, a "Cost of Ownership" template has been developed and included in the forms to be filled out by the Proposer as an element of the submittal package. This form itemizes tasks in three areas, PMI, scheduled maintenance and major component replacement.	According to Section TS 88.4 "Cost of Ownership" a template is quoted in this section to be filled out with the cost of ownership information. However, New Flyer did not find the template in the forms section of the RFP. New Flyer would like to clarify if Pinellas will provide the template.	See Response	See Question 72 for response
94	6	TS 30.1 Wheels	108	All wheels shall be interchangeable except for the middle axle of an artic where a super single tire size is used and shall be removable without a puller	GILLIG wishes to advise that our design would inlcude 9 inch wheels at the front axle and 8.25 inch wheels at the rear axle. This is inherent to our design in order to provide adequate weight rating's needed for the Battery Electric Bus to safely carry the required 75 passengers inclusive of the driver. GILLIG requests approval	See Response	Not approved, need more clarification to understand why there are different wheel sizes between the front and rear axles. **9/15/2021** - Approved - As previously noted, The 9" rims on the front axles are required to provide adequate weight rating's to safely carry up to 75 passengers inclusive of the driver. PSTA are not able to use 9" rims in the rear due tire spacing requirements.
93	6	TS 31.3.4 Steering Wheel Telescopic Adjustment	110	At Maximum Telescopic Height Adjustment: 0 Degree 34in Height	GILLIG wishes to clarify that our proposed steering column with 16" wheel meets and exceeds the Table 4 chart at all levels with one small difference. GILLIG requests approval to provide a height of 33.8 in. at 0 degrees slope at Maximum Telescopic Height Adjustment	Approved	NA
92	6	TS 32. Drive Axle	110	The drive shaft shall be guarded to prevent hitting any critical systems, including brake lines, coach floor or the ground, in the event of a tube or universal joint failure.	GILLIG wishes to advise that our design includes a guard that goes around and below the drive shaft. Although the guard is not above the drive shaft, the inherent position of the drive shaft is below chassis structural beam and therefore protects the coach floor. GILLIG requests concurrence	Approved	NA
91	6	TS 35.4 Hubs and Drums/Discs	113	The bus shall be equipped with brake drums. Brake drums shall allow machining for oversized linings per manufacturer's specifications.	GILLIG wishes to advise that our Battery Electric Bus design is only available with Meritor Air Disc Brakes on All Axles. GILLIG requests approval to omit a Drum Brake option	See Response	Proposer's may specify whichever braking systems are inherent to the design of the bus.
90	6	TS 44.5 Normal Bus Operation Instrumentation and Controls	129	Table 6 Transit Bus Instruments and Alarms	GILLIG requests approval that the instrumentation, switches, controls and indicators can be discussed at the pre-production meeting if GILLIG is the successful bidder. This is due to the unique design of our bus. GILLIG is providing a generic Battery Electric Bus dash layout for review. Please see attached. 	See Response	Proposer's may specify whichever dash layout is inherent to the design of the bus.
89	6	TS 44.6.2 Pedal Dimensions and Position	133	The floor mounted accelerator pedal shall be 10-inches to 12-inches long and 3-inches to 4-inches wide.	GILLIG requests approval to provide an accelerator pedal that is 9-inches long and 3.134-inches wide	Approved	NA
88	6	TS 57. Maintainability	148	High and low refrigerant pressure electronic gauges to be located in the return air area.	GILLIG requests approval to provide a Refrigerant Pressure Display Module in place of gauges in the return air area. This is the standard of the HVAC vendor Thermo King.	Approved	NA
87	6	WR 1.1.4 Propulsion System	190	Propulsion system components, including the engine, transmission or drive motors, and generators (for hybrid technology) and drive and non-drive axles shall be warranted to be free from Defects and Related Defects for the standard two years or 100,000 miles, whichever comes first. An Extended Warranty to a maximum of five years or 300,000 miles, whichever comes first, may be purchased at an additional cost.	GILLIG wishes to clarify that our Powertrain includes a standard warranty from Cummins for Three Years / 100,000 miles with an extension available to a total of Five Years / 250,000 Miles. This is the only available powrtrain warranty available from Cummins. GILLIG requests approval	See Response	Proposer's should submit warranty terms as part of their proposal for consideration by the evaluation committee.

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86	6	WR 1.1.6 Extended Warranty	190	PSTA requires the following additional subsystems to be warranted to be free from Defects and Related Defects for six (6) years. • Batteries • Traction Motor • Inverters • Battery Charger • On-Route Battery Charger	GILLIG wishes to clarify for the following components: - Batteries will include a six (6) year warranty per specification - Traction Motor and Inverters would fall into the aformentioned powertrain warranty of Three (3) Years / 100,000 miles with option to extend to Five (5) Years / 250,000 miles - Battery Charger & On Route Chargers include a base Two (2) Years warranty with optional pricing available up to six (6) years. This pricing will be noted on the Alternatives Pricing sheet GILLIG requests approval	See Response	Proposer's should submit warranty terms as part of their proposal for consideration by the evaluation committee.
85	6	WR 1.3.1 Pass-Through Warranty	192	Should the Contractor elect to not administer warranty claims on certain components and wish to transfer this responsibility to the sub-suppliers, or to others, the Contractor shall request this waiver.	GILLIG is formally requesting a waiver to not administer warranty claims on major components, such as Power Train Components supplied by Cummins, HVAC by Thermo King, Axles by Meritor, destination signs & wheel chair ramp	See Response	Proposer's should submit warranty terms as part of their proposal for consideration by the evaluation committee.
84	6	WR 1.4 Fleet Defects	192	A Fleet Defect shall apply only to the base warranty period in sections entitled "Complete Bus," "Propulsion System" and "Major Subsystems."	GILLIG wishes to clarify that Fleet defect warranty does not apply to major components (Propulsion System, HVAC, Destination Signs, etc.). Major component manufacturers will not recognize and/or participate in fleet defect clauses. GILLIG does work with and will assist the Agency and Major component suppliers to come to a satisfactory resolution in such cases that would otherwise fall into a fleet defect category. GILLIG agrees to the Fleet Defects provisions for the Base warranty as detailed, but cannot guarantee the "Propulsion System" and "Major Subsystems". GILLIG requests concurrence	See Response	Proposer's should submit warranty terms as part of their proposal for consideration by the evaluation committee.
83	6	10. INDEMNIFICATION	Addendum 1, page 4	10.01 Indemnification. The Parties recognize that Contractor is an independent contractor agrees to assume liability for and indemnify, hold harmless, and defend PSTA, its board members, officers, employees, agents and attorneys, of, from, and against all liability and expense, including reasonable attorneys' fees, in connection with any and all claims, demands, damages, actions, causes of action, and suits in equity of whatever kind or nature, including claims for personal injury, property damage, equitable relief, or loss of use, arising out of the execution, performance, nonperformance, or enforcement of this Agreement, whether or not due to or caused by the negligence of PSTA, its board members, officers, employees, agents, and/or attorneys excluding only the sole negligence of PSTA, its officers, employees, agents, and attorneys. This includes claims made by the employees of Contractor against PSTA, and Contractor hereby waives its entitlement, if any, to immunity under Section 440.11, Florida Statutes. Contractor's liability hereunder shall include all attorneys' fees and costs incurred by PSTA in the enforcement of this indemnification provision. Notwithstanding anything contained herein to the contrary, this indemnification provision shall not be construed as a waiver of any immunity from or limitation of liability to which PSTA is entitled to pursuant to the doctrine of sovereign immunity or Section 768.28, Florida Statutes. The obligations contained in this provision shall survive termination of this Agreement, however terminated, and shall not be limited by the amount of any insurance required to be obtained or maintained under this Agreement. 10.02 Control of Defense. Subject to the limitations set forth in this provision, Contractor shall assume control of the defense of any claim asserted by a third party against PSTA arising from or in any way related to this Agreement and, in connection with such defenses, shall appoint lead counsel, in each case at Contractor's expense. Contractor shall have the right, at its option, to participate in the defense of any third party claim, without relieving Contractor of any of its obligations hereunder. If Contractor assumes control of the defense of any third party claim in accordance with this paragraph, Contractor shall obtain the prior written consent of PSTA before entering into any settlement of such claim. Notwithstanding anything to the contrary in this provision, Contractor shall not assume or maintain control of the defense of any third party claim, but shall pay the fees of counsel retained by PSTA and all expenses including experts' fees, if (i) an adverse determination with respect to the third party claim would, in the good faith judgment of PSTA, be detrimental in any material respect of PSTA's reputation; (ii) the third party claim seeks an injunction or equitable relief against PSTA; or (iii) Contractor has failed or is failing to prosecute or defend vigorously the third party claim. Each party shall cooperate, and cause its agents to cooperate, in the defense or prosecution of any third party claim and shall furnish or cause to be furnished such records and information, and attend such conferences, discovery proceedings, hearings, trials, or appeals, as may be reasonably requested in connection therewith.	GILLIG requests the Indemnification clause of this procurement be the same as was agreed to in the State of Florida Heavy Duty Bus Contract with the JTA. Should that not be aggreable to PSTA, GILLIG requests the APTA Recommended Indemnification wording for FTA funded procurements which offers protection for both the Procuring Agency and the Contractor. Reference the attached JTA Contract and APTA INDEMNIFICATION wording.  	See Response	This will be handled in the negotiation portion of the solcaition process
82	6	Section 2, LOCAL TAXES	19	The Contractor shall be liable for payment of all local taxes applicable to the complete bus as delivered and should add these amounts to the Proposal price.	GILLIG requests that the Procuring Agency advise bidders/proposers of any Local, City, County, State, Franchise or Income taxes, tariffs, fees, business licenses and special taxes, or licenses that will need to be paid and/or purchased by the successful bidder/proposer as part of the performance of this contract or option of this contract.		PSTA can not advise on this. It's the contractors responsibility to do their due diligence.
81	6	Section 2, IP 10.2 MULTIPLE AWARD	19	PSTA will make the Contract awards, if any, to the responsive and responsible Proposers who are in compliance . . .	Please advise the projected award date for this procurement?		PSTA intends on taking this to our October 27, 2021 Board of Directors meeting for approval
80	6	Section 3, GC 5 TITLE & WARRANTY OF TITLE	34	Adequate documents for registering title for each of the buses delivered under this Contract in Pinellas County Florida shall be provided to the Agency not fewer than ten (10) business days before delivery to the Agency. Upon acceptance of each bus, the Contractor warrants that the title shall pass to the Agency free and clear of any and all encumbrances.	GILLIG proposes to provide the following industry standard documents if we are the successful bidder for this procurement: 1. Our Manufacturer's Statement of Origin (MSO) document for each vehicle. This form has been approved in all 50 states and transfers ownership directly from the manufacturer to the procuring agency. 2. The procuring agency provides the MSO document to your local Department of Motor Vehicles in order to transfer ownership and secure the title for each vehicle. 3. The procuring agency would be responsible for title fees or licenses, if any.	Approved	Agree and approved
79	6	Section 4, SP 1.2 PILOT BUS	48	. . . No later than seven (7) days after the end of the 30-day test, the Agency shall issue a written report to the Contractor that advises the Contractor of any noncompliance issues and/or any proposed modifications or changes required on the remaining vehicles.	GILLIG requests the agency provide a wriitten report of any non-compliance issue to the contractor within 30 days after delivery. If no issues are reported, acceptance occurs on day 31 or if the agency puts the bus in revenue service. The PILOT bus will have completed full compliance testing at the factory to allow resolution of any Agency issues prior to shipment.	Approved	PSTA approves this request

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78	6	Section 4, SP 2.4 CONTRACT DELIVERABLES - TABLE 1	51	12. PERFORMANCE BOND	Please advise if a PERFORMANCE BOND will be required for this procurement? GILLIG is concerned that the exclusion of this bond will permit irresponsible companies to bid without having sufficient resources to fully satisfy the contract or provide proper long term support for the procuring agency. GILLIG requests the addition of a 100% Performance Bond requirement to your contractual term for all bidders.	See Response	No performance bond is required
77	6	Section 4, SP 3 PAYMENT	53	Payment due date is calculated from time the Agency Accounts Payable Accountant has received and accepted the invoice pursuant to the Florida Prompt Payment Act. Payment due date for purchase of goods or services other than construction services is net forty-five (45) days from the accepted date. No advance payments are authorized. Payment will be made for only actual services or commodities that have been received and accepted by the Agency.	GILLIG requests revision of this section to the current industry standard and APTA recommended payment terms: Payment due date for purchase of goods or services other than construction services is net thirty (30) days from the accepted date.	Denied	PSTA can not approve this request, due to FL statue Florida Prompt payment Act FS218.72 and FS218.73
76	6	Section 4, SP 3.1, PAYMENT TERMS	53	The Agency shall make payments for buses at the unit prices itemized in the price schedule within 45 days after the delivery and acceptance of each bus and receipt of a proper invoice. The Agency shall make payments for spare parts and/or equipment at the unit prices itemized in the price schedule within 45 days after the delivery and acceptance of said spare parts and/or equipment and receipt of a proper invoice.	GILLIG requests revision to the current industry standard and APTA recommended payment terms for FTA funded procurements: The Agency shall make payments for buses at the unit prices itemized in the price schedule within 30 days after the delivery and acceptance of each bus and receipt of a proper invoice. The Agency shall make payments for spare parts and/or equipment at the unit prices itemized in the price schedule within 30 days after delivery and acceptance of said spare parts and/or equipment and receipt of a proper invoice.	Denied	PSTA can not approve this request, due to FL statue Florida Prompt payment Act FS218.72 and FS218.73
75	6	Section 4, SP 7. INSURANCE	55	Contractor must provide a certificate of insurance and endorsement in accordance with the insurance re-requirements listed below by the Effective Date. ...	GILLIG maintains and pays the premiums for insurance of the types and limits it deems sufficient for its protection. The Additional Insured endorsement can be provided as requested. Please note we exceed the requested limits in many areas. Enclosed is a copy of our Certificate of Liability Insurance for your information and approval.	Approved	NA
74	6	Section 4, SP7. PROFESSIONAL LIABILITY INSURANCE	58	Professional Liability Insurance recognizes that the work governed by this Contract involves the furnishing of advice or services of a professional nature, Contractor shall pur-chase and maintain throughout the life of this Contract, Professional Liability Insurance which will re-respond to damages resulting from any claim arising out of the performance of professional services or any error or omission of Contractor arising out of work governed by this Contract. The minimum limits of liability shall be: • $1,000,000 per Claims Made Bases/or per Occurrence • $3,000,000 Aggregate If coverage is provided on a claims made basis, Contractor agrees to maintain such Professional Liability Insurance, as described herein, for a period of at least two (2) years following the conclusion of this Contract, or purchase an extended claims reporting period of two (2) years following the expiration of this Contract.	GILLIG requests deletion of the requirement for Contractor to have Professional Liability Insurance. This coverage is only necessary for professional services such as engineering, architecture, etc. Contractor's General Liability will provide the Agency with insurance protection for product related liability issues.	Approved	Request approved
73	6	SECTION 4, SP 8 Software Escrow Account	59	All the Contractor's policies shall contain an endorsement naming the Agency as an additional insured and providing that written notice shall be given to the Agency's location at least thirty (30) days prior to termination, cancellation or material reduction of coverage in the policy, provided, however, that such notice may be given on ten (10) days' notice if the termination is due to nonpayment of premium. Upon execution of the Contract, the Contractor shall provide the Agency a list of all OEM software comprising proprietary works ("Proprietary Software") for all major vehicle subsystems. From time to time and only upon request, information contained within the listed software may be made available to the Agency through the OEM of the vehicle subsystem. The Contractor and OEM are not obligated to provide copies of source code, as this is proprietary intellectual property; however, the Contractor is obligated to assist the Agency with any technical assistance for the duration of the life of the vehicle. It is the Agency's prerogative to evaluate the long-term viability of the Contractor and its Subcontractors and Suppliers based upon the criteria set forth in "Qualification Requirements."	1. GILLIG requests confirmation that a "separate" Software Escrow Account is not required for this procurement? We request confirmation that a separate Software Escrow Account would only be required in the case of bankruptcy of the Contractor or material breach of the Contract. 2. Paragraph 2 - we request deletion of the requirement to provide the Agency a list of all OEM software comprising proprietary works ("Proprietary Software") or all major vehicle subsystems upon execution of the Contract. GILLIG considers this information to be proprietary and the information is not available from our major subsystem suppliers. 3. GILLIG confirms we will continue to support the Agency through our Field Service Department and Warranty coverage as required in your specifications.	See Response	1. Approved 2. Approved 3. Acknowledged
72	6	Section 6, TS 88.4 COST OF OWNERSHIP	187	In addition to the Proposers submittals describing and defining the service and maintenance requirements for the equipment, a "Cost of Ownership" template has been developed and included in the forms to be filled out by the Proposer as an element of the submittal package.	COST OF OWNERSHIP template is missing from the specifications.	See Response	There was no Total Cost of Ownership form included in the RFP package. PSTA is requesting Proposer's submit information related to anticipated cost of ownership on either their own form or included as a narrative in the proposal response.
71	6	IP 14. Ordering Instructions	28	Each Procuring Agency will forward to PSTA the executed purchase order for the buses being purchased. Each purchase order will contain the pricing for any and all optional equipment and or accessories listed in the Contractor's proposal. The Contractor will promptly assign each order a tracking and control number and forward a copy of the request and purchase order to the Florida Transit Association Finance Corporation(FTAFC) for processing and invoicing of transaction fees ($500 per bus, not to exceed $10,000 per calendar year per Procuring Agency).	GILLIG requests the ordering instruction be changed to the same as is currently used for the Florida Heavy Duty Bus contract with JTA - Upon receipt of quote, review and compare against to ensure that the options and pricing are in accordance with the contract documents. All purchase orders must reference Contract RFP 21-980369 Florida Electric Transit Buses. Upon issuance and approval of your agency purchase order, send directly to the contractor. Under this contract, the contractor will be responsible for providing Florida Transit Association Finance Corporation (FTAFC) a copy of each agency's purchase order upon receipt. The contractor will also provide the FTAFC with a quarterly statement of purchases made off the contract. The FTAFC will issue an invoice to the procuring agency to pay the FTAFC a transaction fee of Five Hundred dollars (500.00) not to exceed ten thousand dollars ($10,000.00) per calendar year.	See Addendum	See Addendum for Revised Ordering Instructions
70	6	TS 5.9 Technical Service Representatives	78	The Contractor shall provide full-time, on-site technical support representative for the buses and charging and associated equipment for the first two (2) years after bus delivery, with annual renewal options for ten (10) more years	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Addendum #4 deleted the requirement of providing a full-time, on-site technical support representative for two years after bus delivery with annual renewal options for ten years. All other language in TS 5.9.1 Technical/Service Representatives still applies. Proposer shall provide sufficient information in their proposal detailing their field service support capabilities, including response times, staff levels, service centers (if applicable), for both the bus and charging equipment.
69	6	TS 88.3 Conditional Assessment	187	The Contractor shall be responsible for conducting a conditional assessment of the buses at the end of one year and three years of service life.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately as an option.

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68	6	TS 89.1 Charger Maintenance Procedures	187	The Contractor shall provide a three (3) years of maintenance technical support of the charging equipment (both on-route and depot charges). This three year period shall correspond to the warranty period in start and end date as outlined in the Warranty Section. A written maintenance plan and training must be provided to the Agency prior to acceptance. The plan shall include at a minimum a 52 week preventative and scheduled maintenance and Long-term capital rehab / replacement plan for the life of the system. PSTA will use its own staff (or through the use of outside subcontractors) to provide weekly inspections as required to check fluids, drain filters and perform other similar light inspection and service as documented in the maintenance plan. Contractor shall visit the site not less frequently than once per month to perform inspections and maintenance as required. These visits must be coordinated with the Agency to ensure that there are buses that can be charged to allow operational testing. Contractor shall maintain detailed records of all inspections, calibrations, tests, maintenance and repairs. Information shall be provided to the Agency on a timely basis for storage.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately for the three (3) years of technical support as an option. However, a written maintenance plan and initial training for charging equipment shall be furnished to the agency as a contract deliverable and at no additional cost.
67	6	TS 89.2 Maintenance Materials and Licenes	188	The Contractor shall supply all parts and consumables included within the cost of the contract. The Contractor shall maintain an inventory of all required parts including consumables and major repair parts during the terms of this contract. The Agency will pay the cost of all electric power and communications to the station. The Agency will provide insurance on the property. Contractor will provide other insurance as indicated elsewhere in this document Contractor shall keep all operating permits current. Contractor shall at their own expense provide any documentation and/or testing required and pay any fees required for these permits. Contractor shall pay any upgrade or annual license fees as required to keep all copies of software current.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately as an option.
66	6	TS 89.4 Performance Reporting	188	The Contractor shall be responsible for monitoring the performance of the charging equipment and re-porting the condition to the Agency on a monthly basis. The report should include any recommendations for improve-ments that improve the charging of the buses or reduce the overall operational costs during the duration of the contract.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately as an option.
65	6	TS 89.4 Conditional Assessment	188	The Contractor shall be responsible for conducting a conditional assessment of the charging equipment at the end of one year and three years of service life.	GILLIG requests this requirement be priced seperately from the base bus as an option. GILLIG believes that not every purchasing agency will require this type service and including it the base bus price will only inflate the cost.	See Response	Approved. Please submit pricing separately as an option.
64	6	TS 90 Exportable Power Supply	189	Please describe the capabilities of the vehicle to provide power to auxiliary systems outside of the bus when stationary.	GILLIG wishes to advise that our Battery Electric Bus is not designed to power to auxiliary systems outside of the bus and therfore will not be proposed.	See Response	Acknowledged.
63	6	#3 - Agreement For Electric Transit Buses with Charing and Associated Equipment	Page 1	SCOPE OF SERVICES. Contractor, at the direction of PSTA, shall furnish to PSTA Electric Transit Buses with Charging and Associated Equipment as described in, and in accordance with the specifications, tasks, and scope of work set forth in the RFP (the "Services"), and in the amount set forth in the RFP. Contractor acknowledges that it has read the specifications and understands them. **Contractor also agrees to provide electric transit buses with charging and associated equipment to all permissible assignees of PSTA. PSTA's permissible assignees shall have the option to purchase electric transit buses and charging and associated equipment in accordance with the terms and conditions of the RFP**, and specifically SP 3of the RFP.	GILLIG requests clarification: How do you determine who is a "permissible assignee" and will PSTA athorization be required to be a permissable assignee?	See Response	1. "permissible assignee" shall mean all State agency, the legislative and judicial branches, political subdivisions, counties, school boards, community colleges, municipalities, transit authorities, special districts, or other public agencies or authorities. 2. Will PSTA authorization be required to be a permissible assignee- NO
62	6	NR 3. Proposal Due Date and Submittal Requirements	13	Proposals must be received by 10:00 am local time on Tuesday, September 21, 2021. (date changed in Addendum 5)	Request that the proposal due date be not less than three (3) weeks after receipt of responses to Requests for Pre-Offer Change or Approved Equal and/or the final Addendum. This will ensure that Offerors have sufficient time to thoroughly review any changes and secure appropriate quotes from suppliers.	See Response	Not sure if this is still applicable
61	6	SP 1.2 Pilot Bus	48	The Contractor shall produce one pilot vehicle for each type of vehicle with respect to the base order.	Request that the requirement for a pilot bus be removed as there is no clear indication of how many buses woud be purchased in the base order, or which agency would be managing the base order.	See Response	PSTA prefers to keep the language "as-written" in the RFP for the purposes that it shall apply to order quantities of two (2) or greater.
60	6	TS 5.13 Fire Suppression	80	The buses shall be equipped with a suitable means of automatically detecting and extinguishing fires and/or overtemperature situations that may cause unreliable or unsafe operation.	Please clarify whether the base bus pricing should include a Fire Suppression Sytem as there are lines for a number of different fire suppression systems on the Pricing Schedule. Note: Proterra's base design does not include Fire Suppression; however, we can add any of the options listed on the pricing schedule.	See Response	The base bus shall be equipped with a suitable fire suppression system manufacture red by Amerex, or approved equal.
59	6	TS 6.4 Step Height TS 6.4.1 Transit Coach	82	The step height shall not exceed 16.5 in. at either doorway without kneeling and shall not exceed 15.5 in. at the step. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.	Request approval for the step height to not exceed 15.7" at the front doorway and 17.1" at the rear doorway when the doors are open to passenger ingress (un-knelt) or 13" at the front doorway and 14.4" at the rear doorway when fully knelt. One of the major benefits of the Proterra ZX5 vehicle is the placement of the battery packs under the floor and between the axles. Having the batteries located in this position allows for the following benefits: Lower Center of Gravity for better handling and increased safety; no HV batteries located in the passenger compartment; and batteries mounted lower than the side impact height for automobiles.	Approved	NA
58	6	TS 6.6 Ramp Clearances	82	The breakover angle is the angle measured between two lines tangent to the front and rear tire static loaded radius and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll. 8 deg min front breakover	Request approval for a breakover angle of 7.8 degrees at ride height. Note that our bus has an over-raise feature that can be engaged while driving that increases the breakover angle up to 8.9 degrees.	Approved	NA
57	6	TS 6.8 Floor Height TS 6.8.1 Transit Coach	83	Height of the step above the street shall be no more than 16 in. measured at the centerline of the front and rear doorway. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.	Request approval for the step height to not exceed 17.1" at the rear doorway when the doors are open to passenger ingress (un-knelt) Note that rear doorway step height decreases to 14.4" when fully knelt. One of the major benefits of the Proterra ZX5 vehicle is the placement of the battery packs under the floor and between the axles. Having the batteries located in this position allows for the following benefits: Lower Center of Gravity for better handling and increased safety; no HV batteries located in the passenger compartment; and batteries mounted lower than the side impact height for automobiles.	Approved	NA
56	6	TS 7.3 Acceleration	85	The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming. The manufacturer shall supply the new performance data. The Contractor shall provide performance scans to the Agency based on the Agency's specific drivetrain configuration.	Request approval of our standard offer which includes a choice of 3 pre-configured customer selectable settings for acceleration and regenerative braking levels per the options described in Exhibit A. These settings have been optimized for ideal performance and efficiency, and we would work with the Authority to determine the best solution based on the Authority's profile and preferences.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
55	6	TS 9.1.3 Primary Propulsion Unit and Traction Motor(s)	89	The propulsion and braking systems shall meet the performance requirement of the Duty Cycle. Braking application and performance shall remain consistent regardless of the System State of Charge (SOC) or other variances related to regenerative braking. The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming. The manufacturer shall supply the new performance data. In addition to power required for propulsion, sufficient excess power shall be available to operate all accessories at their normal operating condition throughout the transit bus duty cycle.	Request approval of our standard offer which includes a choice of 3 pre-configured customer selectable settings for acceleration and regenerative braking levels per the options described in Exhibit A. These settings have been optimized for ideal performance and efficiency, and we would work with the Authority to determine the best solution based on the Authority's profile and preferences.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
54	6	TS 9.1.3 Primary Propulsion Unit and Traction Motor(s)	89	The propulsion system shall be designed so that no component operates at more than 80% of its maximum designed load, speed,, voltage or amperage. A programmable system shall be provided to limit motor speed to a safe value. Propulsion system operation, including charging of the energy storage system, shall be electronically controlled. It shall have a programmable performance control system and the latest maintenance and diagnostic software system. PSTA will be granted access to full re-programming functionality to all components of the vehicle.	Request approval of our standard offer which includes a choice of 3 pre-configured customer selectable settings for acceleration and regenerative braking levels per the options described in Exhibit A. These settings have been optimized for ideal performance and efficiency, and we would work with the Authority to determine the best solution based on the Authority's profile and preferences.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.

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53	6	TS 9.1.5 Propulsion System Controller (PSC)	92	The PSC regulates energy flow throughout system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (voltages, currents, temperatures, etc.) within specified operating ranges.	Request approval of our system design which does not use a Propulsion System Controller (PSC). We utilize a powertrain controller to manage the traction motor and transmission, an ESM to interface to the batteries, a charge controller for charging, and a vehicle controller to integrate the systems all together. The vehicle controller manages all power flow and ancillary load management.	Approved	NA
52	6	TS 10.1 Component Thermal Management	94	A means of determining satisfactory component coolant level shall be provided. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system with both it and the water filler no more than ±60 in. above the ground. Both shall be accessible through the same access door.	Request approval of our proposed coolant system design which does not incorporate a manual pressure relief valve. The expansion tank cap relieves pressure above 13psi. During fill, a solenoid valve opens which relieves pressure while the fill pump is running.	Approved	NA
51	6	TS 15 Radiator	98	Radiator piping shall be stainless steel, brass tubing or painted steel rated at 1000 hours of salt spray according to ASTM B117. Where practicable, hoses shall be eliminated. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360 deg. seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material.	Request approval of our standard Mubea radiator clamps. The clamps are steel and have passed a 1,000+ hour salt spray test. Please refer to Exhibit B for more information.	Approved	NA
50	6	TS 29.3.4 Kneeling	108	An indicator visible to the driver shall be illuminated until the bus is raised to a height adequate for safe street travel. An audible warning alarm will sound simultaneously with the operation of the kneeler to alert passengers and bystanders. A warning light mounted near the curbside of the front door, a minimum 2.5 in. diameter amber lens, shall be provided that will blink when the kneel feature is activated. Kneeling shall not be operational while the wheelchair ramp is deployed or in operation.	Request approval of our standard warning light which is a minimum of 1.75" diameter amber lens.	See Response	Conditional approval is granted on the basis that the 1.75" diameter lenses meet FVMSS, ADA, or any other governing body specification for use on a public transit bus.
49	6	TS 37.3 Air Lines and Fittings	115	DEFAULT • Green: Indicates primary brakes and supply. • Red: Indicates secondary brakes. • Brown: Indicates parking brake. • Yellow: Indicates compressor governor signal. • Black: Indicates accessories.	Request approval of the following color combination for air lines: • Green: Indicates primary brakes and supply • Red: Indicates secondary brakes • Brown: Indicates parking brake • Yellow: Indicates transmission and ride height controller feed (we don't have governor air lines) • Black: Indicates accessories & doors • Blue: Indicates curb side air bags • Orange: Indicates street side air bags	Approved	NA
48	6	TS 38.1 Modular Design	117	Design of the electrical, electronic and data communication systems shall be modular so that each electronic device, apparatus panel, or wiring bundle is easily separable from its interconnect by means of connectors.	Request approval of our standard multicore cable which runs from the drivetrain to the power steering motor at the front of the vehicle. It passes through 2 bulkheads and is part of a drivetrain harness. Maintaining a constant shield is important to protect other systems from Electro-Magnetic Interference. Also, reducing the number of terminations also improves the reliability of the circuit. If this cable were to be damaged and be required to be replaced, it can be done with minimal extra effort when compared to the requested design. To date, we haven't replaced this cable on any vehicle in service.	Approved	NA
47	6	TS 40.5 High Voltage Disconnect System	121	The high-voltage system shall be fitted with automatic disconnecting contactors located as closely as possible to the positive and negative battery output terminals so as to minimize the external circuitry that is not de-energized when the devices open. These contractors shall be in addition to any such devices incorporated in the motor controller, and shall not require electrical power to operate (that is, they shall be normally open when unpowered). The contactors shall be rated as capable of interrupting the maximum normally encountered charging or operating current at the highest voltage likely to be encountered (maximum charger-output voltage, or charger-input voltage, whichever is greater). Contactors shall be controlled by the "High Voltage Disconnect" switch, and any safety-critical interlocks and interlock loops, motor-controller overcurrent- protection functions, and vehicle crash and/or fire sensors. Reset of the contactors shall require the deliberate action of the operator or maintenance personnel. Contactors should provide a visual or electrical indication of their status (open or closed) or of a failure to function.	Request approval of our standard design high voltage disconnect system which operates as follows: - Our system utilizes redundant contactors. One set in each battery pack and another set in the main HV junction box. - A separate HV disconnect is a physical disconnect and doesn't go through the contactors. - The contactors are controlled by the BMS and vehicle controller with a number of different conditions that can disable them.	See Response	Please submit further explanation as part of your proposal for review by the evaluation committee.
46	6	TS 41.1.2 Shielding	125	All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However, certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable. NOTE: A shield grounded at both end forms a ground loop, which can cause intermittent loss of control or faults. When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.	Request approval of our standard design which has some shields that are grounded at both ends per the component manufactures installation instructions (i.e. power cables between the motor and Inverter)	See Response	Please submit further explanation as part of your proposal for review by the evaluation committee.
45	6	TS 44.5 Normal Bus Operation Instrumentation and Controls	129	The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the operator. The operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.	Request that the instrumentation and controls listed be noted as representative only and that the final layout of instrumentation and controls be agreed upon in the pre-production meeting(s).	See Response	Proposer's may specify whichever dash layout is inherent to the design of the bus.
44	6	TS 44.6.1 Pedal Angle	133	The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 37 to 50 deg at the point of initiation of contact and extend downward to an angle of 10 to 18 deg at full throttle. The location of the brake and accelerator pedals shall be determined by the manufacturer, based on space needs, visibility, lower edge of windshield and vertical H-point.	Request approval for the pedal angles to be as follows: -Accelerator pedal 45° at initiation and 25° at full throttle -Brake pedal 45° at initiation and 25° at full brake	Approved	NA
43	6	TS 47.7.1 Exterior Mirrors	138	The bus shall be equipped with corrosion-resistant, outside rearview mirrors mounted with stable supports to minimize vibration. Mirrors shall be firmly attached to the bus to minimize vibration and to prevent loss of adjustment with a breakaway mounting system. Mirrors shall permit the driver to view the roadway along the sides of the bus, including the rear wheels. Mirrors should be positioned to prevent blind spots.	Request approval of our standard exterior mirrors as described in Exhibit C. Please note that additional options and sizing on the Price Sheet are not available on Proterra buses.	See Response	Proposer's may specify whichever mirrors are inherent to the design of the bus.
42	6	TS 49.1 Glazing	140	Shaded Band The upper portion of the windshield above the driver's field of view shall have a dark, shaded band and marked AS-3, with a minimum luminous transmittance of 5 percent when tested in accordance to ASTM D1003.	Request approval for our standard windshield design which does not have a shaded band as our overhead panel is fairly low and a shaded band may interfere with mirror visibility. Proterra could apply a tint film with 5% LT that sits just below the blackout on the street side of the windshield.	Approved	NA
41	6	TS 50 Driver's Side Window	140	The driver's side window shall be the sliding type, requiring only the rear half of the sash to latch upon closing, and shall open sufficiently to permit the seated operator to easily adjust the street-side outside rearview mirror. When in an open position, the window shall not rattle or close during braking. This window section shall slide in tracks or channels designed to last the service life of the bus. The operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single-density tint.	Request approval for our standard driver's side window which is hidden frame and non-egress as described in Exhibit D. Please note that traditional framed windows, full slider, and egress driver's side windows are not available on Proterra buses.	See Response	Proposer's may specify whichever windows are inherent to the design of the bus.
40	6	TS 50 Driver's Side Window	140	The driver's view, perpendicular through the operator's side window glazing, should extend a minimum of 33 in. (840 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 26 in. (560 mm) above the operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.	Request approval for our standard driver's side window which allows the view through the glazing at the front of the assembly beginning not more than 27.2 in. above the operator's floor.	Approved	NA

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39	6	TS 51 Side Windows TS 51.1 Configuration	141	Side windows shall not be bonded in place, but shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. All aluminum and steel material will be treated to prevent corrosion.	Request approval of our standard passenger windows which are flush and not bonded; however, our design incorporates a quarter window just ahead of the front entrance door which is bonded in place.	See Response	Proposer's may specify whichever windows are inherent to the design of the bus.
38	6	TS 51 Side Windows	142	Default and Alternative Configurations	Request approval for Proterra's streamlined body design which exclusively uses hidden frame side windows. Please note that traditional framed windows are not available on Proterra buses.	See Response	Proposer's may specify whichever windows are inherent to the design of the bus.
37	6	TS 54.3 Controls for the Climate Control System (CCS)	146	The controls for the driver's compartment for heating, ventilation and cooling systems shall be integrated and shall meet the following requirements: • The heat/defrost system fan shall be controlled by a separate switch that has an "off" position and at least two positions for speed control. All switches and controls shall preclude the possibility of clothing becoming entangled, and shields shall be provided, if required. If the fans are approved by the Agency, an "on/off" switch shall be located to the right of or near the main defroster switch. • A manually operated control valve shall control the coolant flow through the heater core. • If a cable-operated manual control valve is used, then the cable length shall be kept to a minimum to reduce cable seizing. Heater water control valves shall be "positive" type, closed or open. The method of operating remote valves shall require the concurrence of the Agency project manager.	Request approval for our standard design which does not require a manually operated control valve because the heater is electrical and does not use heated water.	See Response	Proposer's may specify whichever system/controls method is inherent to the design of the bus.
36	6	TS 54.4 Driver's Compartment Requirements	147	A ventilation system shall be provided to ensure driver comfort and shall be capable of providing fresh air in both the foot and head areas. Vents shall be controllable by the driver from the normal driving position. Decals shall be provided, indicating "operating instructions" and "open" and "closed" positions. When closed, vents shall be sealed to prevent the migration of water or air into the bus.	Request approval for our standard design which does not have provisions to provide fresh-air (exterior air) to the driver's area.	See Response	Please submit further explanation as part of your proposal for review by the evaluation committee.
35	6	TS 57 Maintainability	148	DEFAULT High and low refrigerant pressure electronic gauges to be located in the return air area.	Request approval for our standard design which does not incorporate remote "mechanical" gauges and has no provisions for them. The high and low pressures can be viewed through an unlocked service screen on our HVAC controller. Also, the high and low pressure are on the CAN messages and are visible through the service tool.	Approved	NA
34	6	TS 62 Repair and Replacement TS 62.1 Side Body Panels (Transit Coach)	149	Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired in lengths not greater than 12.5 ft.	Request approval for our standard bus design which uses a composite, monocoque body that does not have exterior paneling. The outer skin is integral to the body structure. When damage occurs to the exterior of the vehicle, the repair is contained to just the damaged area. The side body from floor to window is repairable with common composite repair techniques. The body is also covered with a gel coat that resists chips and cracks.	Approved	NA
33	6	TS 67.1 Access Doors (Transit Coach)	150	Access openings shall be sized for easy performance of tasks within the compartment, including tool operating space. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. All access doors shall be retained in the open position by props or counterbalancing with overcenter or gas-filled springs with safety props and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems. If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.	Request approval for our standard design which has lower side access doors for the motor compartment that, when opened, restrict access to the upper side access doors. All other access doors, when opened, do not restrict access for servicing other components or systems. Please see Exhibit E for additional details.	See Response	Approval is granted that your standard design which has lower side access doors for the motor compartment that, when opened, restricts access to the upper side access doors. However, upon review of the pictures contained in your Exhibit E—Access Panels, it appears that the lower panel's right hand door support strut would need to be removed into order to pull the 12/24 V battery tray out. Please confirm.
32	6	TS 69.1 Appearance	152	All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system Supplier prior to application of paint to ensure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting, where possible, to prevent corrosion. The bus shall be painted prior to installation of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.	Request approval for the base white color of the bus body to be gelcoat rather than paint. The gelcoat is inherent to the composite body construction and is resistant to chips and cracks. Please note that due to Proterra's design with hidden frame windows, black masking at the windows is not applicable.	Approved	NA
31	6	TS 73.19 Farebox/Card Reader Lighting TS 73.19.1 Transit Coach	160	ALTERNATIVE (TRANSIT COACH) Provide a farebox and card reader light.	Please clarify whether farebox and card reader lights are part of the base bus or an option. If the intent is for these to be an option, please add a line item to the Pricing Schedule.	See Response	It is part of the base bus.
30	6	TS 76.15 Construction and Materials (Transit Coach)		Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners. Coloring shall be consistent throughout the seat material, with no visually exposed portion painted. Any exposed metal touching the sides or the floor of the bus shall be stainless steel. The seat, pads and cushions shall be contoured for individuality, lateral support and maximum comfort and shall fit the framework to reduce exposed edges. The minimum radius of any part of the seat back, handhold or modesty panel in the head or chest impact zone shall be a nominal ¼	Request approval of our standard seats which are bolted into the body with hex bolts and locknuts onto tee bolts with the seat rail. The seats themselves are built with tamper-resistant fasteners.	Approved	NA
29	6	TS 78.5 Door Glazing	170	Door glazing shall be easily replaceable.	Request approval for our standard Ventura door glazing replacement procedures as defined in Exhibit F.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
28	6	TS 78.9 Actuators	171	If powered by compressed air, exhaust from the door system shall be routed below the floor of the bus to prevent accumulation of any oil that may be present in the air system and to muffle sound.	Request approval of our standard design in which the exhaust from the door system is not routed below the floor of the bus. It exits through a muffler on the valve block of the actuator mechanism. Oil in the air lines is separated out by an individual air filter for each door.	Approved	NA
27	6	TS 85 Electronics/Equipment Compartment	180	Each bus shall be equipped a fully sealed compartment located on the left front wheelhouse to provide a mounting location for radio equipment, video recording equipment, APC equipment and other electronic equipment. The compartment shall be lockable, completely water resistant and of steel construction. It shall be accessible from inside the bus, shall have 3 slide trays that automatically lock into place for easy maintenance of the equipment. The compartment shall be water resistant when the service door is secured. The compartment shall be supplied with power and ground circuit requirements.	Request approval for our standard ITS storage box which is located on the street-side wheel housing. Please note that our storage box is designed to provide sufficient access to customer ITS-related equipment as shown in Exhibit G.	See Response	Approved. Please also submit these materials as part of your proposal for review by the evaluation committee.
26	6	TS 87 Charging System Specifications	182	The chargers shall be equipped with an submeter that: Measures and displays kWh consumed and real time load in KW within 1% accuracy; Is capable of RS-485 communications; and Records kWh and kVARh delivered, kWh and kVARh received.	Can the submetering be handled by an external device, or must it be part of the charger?	See Response	It can be either an external device or part of the charger.
25	6	TS 87.1 "In-Shop" and/or "Depot Charger"	183	The bus mounted receptacle shall be of simple and ergonomic design, of not more than 25 pounds (plug and cord), not more than two plugs, and heavy-duty construction, and shall not be energized except when mated with the charger connectors.	Is there a minimum cable length required?	See Response	No. Proposer shall state what their standard length offering is along with whether custom lengths are available.
24	6	S-10 Pricing Schedule	N/A	Entire Form	Please clarify that it is not mandatory to quote every line item listed as some line items are not available on Proterra Electric Buses.	See Response	It is not mandatory to quote every line item. For those items not quoted please mark as "No Quote".

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23	6	S-10 Pricing Schedule	N/A	Destination Signs	Per Addendum 1 (through 4), the base buses should include destination signs on the front and side; the rear sign is listed as an alternative. The Pricing Schedule lists standalone options for 126 Luminator Rear View Camera Integrated into Rear LED sign; and Luminator--Delete Rear Sign. Neither of those would be appropriate if the base buses do not include a rear sign.	See Response	The base bus shall be furnished with a front and right side (curbside) destination sign, Luminator Smart Series III with white LED, or approved equal. A rear sign may be quoted as optional equipment. Being said, the call-out Luminator--Delete Rear sign is not applicable and should be disregarded.
22	4	TS 7.4	85	**TS 7.4 Operating Range** The operating range of the coach shall be designed to meet the operating profile as stated in the "Design Operating Profile" section. The operating range of the coach on a single battery charge shall be designed to meet the following targeted ranges per the operating profiles as stated in the "Design Operating Profile" section.	Will PSTA specify the minimum operating range requirement?	See Response	There are no minimum range requirement specifications established in this RFP. As stated in the RFP and during the pre-proposal meeting Proposers shall supply the range information requested in TS 8.1 for each size bus being submitted for consideration utilizing the Altoona On-Road Energy Consumption and Range Tests for buses. Specifically, CBD, ART, and COM Duty Cycles.
21	4	TS 7.3	85	**TS 7.3 Acceleration** Braking application and performance shall remain consistent regardless of system state of charge (SOC) or other variances related to regenerative braking.	We would like to clarify that electric bus is equipped with two braking systems to decelerate the bus. One is a pneumatic friction-based brake system, and another is a regenerative braking system. The braking performance is different with and without regenerative braking. Regenerative braking is availiable(braking performance is consistent) regardless of system SOC in our design. While, if the regenerative braking is limited or not availiable due to special condition, the braking performance is different. We request approval of the design.	Approved	NA
20	4	TS 8.2	87	**TS 8.2 Design Operating Profile (Battery Electric Bus)** Supply a performance summary for the exact bus(es) to be built, utilizing a 130% passenger load. Data to show AT LEAST the following: time to speed on flat ground, 5%, 7%, 10% and maximum grade for speeds of 5, 10, 15, 25, 35 mph (or maximum for each grade).	We would like clarity that as opearaing range varies with road conditions, wheather, bus configuration, driver behavior etc., We request the agency to provide a detail ruote profile data(including bus speed vs time, route grades vs bus speed, preferably at a sampling frequency of 1 Hz or greater)	See Response	Detailed route data is not available. As stated in the RFP and during the pre-proposal meeting Proposers shall supply the range information requested in TS 8.1 for each size bus being submitted for consideration utilizing the Altoona On-Road Energy Consumption and Range Tests for buses. Specifically, CBD, ART, and COM Duty Cycles. Assume ambient temperature of 90 deg F and weather customary to the State of Florida.
19	4	TS 8.2	87	**TS 8.2 Design Operating Profile (Battery Electric Bus)** Supply a performance summary for the exact bus(es) to be built, utilizing a 130% passenger load. Data to show AT LEAST the following: time to speed on flat ground, 5%, 7%, 10% and maximum grade for speeds of 5, 10, 15, 25, 35 mph (or maximum for each grade).	If detail route profile data is not available, We request approval to provide Altoona cycle operaing range for reference.	See Response	See answers to previous questions.
18	4	TS 9.1.4	90	**TS 9.1.4 Energy Storage System and Controller** **Energy Storage System** A phased automatic shutdown system shall be provided	We would like PSTA to clairify the "A phased automatic shutdown system". What is the function? How does it work?	See Response	The intent of the specification is that sufficient warnings will be given to the operator that the SOC is running low. The intent of a "phase automatic shutdown" is, as an example, at 30% SOC a warning indicator, audible tone, is given, at 20% SOC the bus may derate in performance to conserve energy, at 10% SOC the bus goes into "limp-home" mode, at 0% the bus automatically shuts down. The levels of SOC stated previously are only used to illustrate the intent. Proposers shall specify what form of low-SOC shutdown protocols are in use.
17	4	TS 9.1.4	92	**TS 9.1.4 Energy Storage System and Controller** **Energy Storage System** **Battery Charging** The bus shall support an SAE-approved charging standard (SAE J3068 AC and/or SAE J1772 DC).	Will PSTA accept our AC charging as an option? Our AC chagring has SAE J-3068 connector but not fully compliant to SAE J-3068.	See Response	Manufacturer shall provide a detailed description of its charging system and specify its compliance with one of the listed standards. If the charging system cannot meet compliance provide detailed information as part of the Proposal so that the Evaluation Committee may review and make a determination on acceptance.
16	4	TS 9.1.6	93	**TS 9.1.6 Hybrid System Controller (HSC)** The HSC regulates energy flow throughout hybrid system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (e.g., voltages, currents, temperatures, etc.) within specified operating ranges.	We requests to delete this requirement as the RFP is for electric bus.	See Response	If the specification does not apply to a manufacturer's bus design the Proposer may consider it not applicable.
15	4	TS 19	99	**TS 19. Altoona Testing** **DEFAULT** An Altoona Test Report shall be provided to the Agency with the Proposal submittal.	Will PSTA accept to provide altoona report prior to first bus delivery? And FTA does allow for test to be accepted upon delivery of the first bus.	See Response	The bus will need to satisfy meeting FTA Pre Award, Post delivery and FAST Act requirements.
14	4	TS 26.5	103	**TS 26.5 Construction** Plywood shall be certified at the time of manufacturing by an industry-approved third-party inspection agency such as APA – The Engineered Wood Association (formerly the American Plywood Association).	We would like clarity that the standard floor is Coosa Composite fiberglass composite floor. Coosa fiberglass composite floor can meet both FMVSS 302 and docekt 90 requirement. And it is also Altoona tested in our bus. We requests approval of Coosa fiberglass floor.	Approved	NA
13	4	TS 56	148	**TS 56. Roof Ventilators** **ALTERNATIVE** Three Roof Ventilators (Used in articulated buses.)	Will PSTA accept two roof ventilators in articulated bus?	See Response	Yes, so long as number of ventilators satisfies compliance with FMVSS for minimum number of escape hatches.
12	4	TS 52	144	**TS 52. Capacity and Performance** **ALTERNATIVE** R134a The air conditioning system shall meet these performance requirements using R134a	R410a has a greater efficiency,lower price than R134a. Also R410a is more friendly to environment. We request approval for OUR HAVC which uses R410a for the system.	Approved	NA

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<tr><td>11</td><td>4</td><td>TS 78.1.2</td><td>168</td><td>TS 78.1.2 Rear Door(s)

In cases where street-side and curbside doors are chosen, provisions shall be made for operating the front door, curbside rear door(s) and street-side rear door(s) independently or in the combinations shown in Table 7 while providing positive tactile feedback to the operator identifying the door control selection.

TABLE 7
Door Operating Combinations
<table><tr><th>Front</th><th>Curbside Rear</th><th>Street-Side Rear</th></tr><tr><td>Closed</td><td>Closed</td><td>Closed</td></tr><tr><td>Open</td><td>Closed</td><td>Closed</td></tr><tr><td>Open</td><td>Open</td><td>Closed</td></tr><tr><td>Open</td><td>Closed</td><td>Open</td></tr><tr><td>Open</td><td>Open</td><td>Open</td></tr><tr><td>Closed</td><td>Open</td><td>Closed</td></tr><tr><td>Closed</td><td>Closed</td><td>Open</td></tr><tr><td>Closed</td><td>Open</td><td>Open</td></tr></table></td><td>Does PSTA need one front door, one curbside rear door and one street-side rear door in articulated bus? If not, please specify door number and door location.</td><td>See Response</td><td>Disregard all references to "street-side" doors for articulated bus in this RFP. The doors being specified will be curbside only, mounted in the standard manufacturer locations.</td></tr>
<tr><td>10</td><td>4</td><td>TS 5.9.1</td><td>78</td><td>TS 5.9.1 Technical/Service Representatives

The Contractor shall, at its own expense, have one or more competent technical service representatives available on request to assist the Agency in the solution of engineering or design problems within the scope of Services and the specifications that may arise during the warranty period. This does not relieve the Contractor
of responsibilities under the provisions of "Section 7: Warranty Requirements."

The Contractor shall provide full-time, on-site technical support representative for the buses and charging and
associated equipment for the first two (2) years after bus delivery, with annual renewal options for ten (10)
more years.</td><td>Proponent requests that requirement for full-time on-site technical support representatives for two years and beyond be removed as this will be cost prohibitive.

Proponent has technical support staff for the bus that can provide solutions remotely or a technician in a service truck could be dispatched within 24-48 hours. Technical service for chargers also would be remote and an on-site representative could be provided within 24-48 hours.

We request your approval.</td><td>See Response</td><td>PSTA approves of the request to delete the requirement of providing a full-time, on-site technical support representative for two years after bus delivery with annual renewal options for ten years.

All other language in TS 5.9.1 Technical/Service Representatives still applies.

Proposer shall provide sufficient information in their proposal detailing their field service support capabilities, including response times, staff levels, service centers (if applicable), for both the bus and charging equipment.</td></tr>
<tr><td>9</td><td>3</td><td>SP 2.4</td><td>51-53</td><td>SP 2.4 Contract Deliverables
Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.</td><td>We request clarification regarding the quantities of manuals needed. Please clarify which section prevails between Table 1: Contract deliverables and SP 5.2 Documentation.</td><td>See Addendum</td><td>Revised Table 1—Contract Deliverables attached.

</td></tr>
<tr><td>8</td><td>3</td><td>SP 2.4</td><td>51</td><td>SP 2.4 Contract Deliverables
Contract deliverables associated with this Contract are set forth in Table 1, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.</td><td>As per item 18 of Table 1, we understand that the City requests 20 bus orientation video. We propose to offer PSTA the right to film the on-site orientation training which includes a tour of the bus for future internal use.</td><td>Approved</td><td>NA</td></tr>
<tr><td>7</td><td>3</td><td>SP 2.5</td><td>54</td><td>SP 5.2 Documentation
The Contractor shall provide an electronic copy and three (3) printed current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy and three (3) printed current parts manual(s), and an electronic copy and three (3) printed standard operator's manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator's manuals and parts books up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.</td><td>There are incoherencies between the two section regarding the documentation specifications and Nova Bus would like to offer the best service according to the real needs of PSTA.</td><td>See Response</td><td>Revised SP 5.2 Documentation: The Contractor shall provide an electronic of current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy of current parts manual(s), and an electronic copy of standard operator's manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator's manuals and parts manuals up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.</td></tr>
<tr><td>6</td><td>2</td><td>TS 84.1 Camera Surveillance System</td><td>179</td><td>Provide all wiring and mounting locations for a multi-camera surveillance system, including the installation of cameras, recorder, microphone, etc..</td><td>Proposer requests information on whether or not a camera system should be included in the base bus price. Currently, various information pertinent to details of this system such as supplier, number of cameras, type of DVR and functionalities are missing from the technical specifications. Such information is essential to be able to provide
accurate pricing and configuration. In light of this, proposer requests approval to provide price of such systems only through optional itemsincluded in CER 6. Pricing Schedule</td><td>See Response</td><td>DEFAULT
No camera system.
ALTERNATIVE
A camera system shall be installed. Agency to select from list of available camera systems from OEM options list including installation locations.
ALTERNATIVE
Pre-wire only. Agency may select to have vehicle pre-wired only for a camera system.</td></tr>
<tr><td>5</td><td>2</td><td>CER 6. Pricing Schedule</td><td>NA</td><td>NA</td><td>The specification of several systems such as Destination signs, Camera Systems, and Automatic Passenger Counters are missing configuration details that are essential for costing. Proposer understands that the its base bus configuration will not have any of such systems, but optional pricing for those will be provided via CER 6. Pricing Schedule for interested agencies. Please confirm our understanding.</td><td>See Addendum</td><td>Pricing Scheduled has be updated</td></tr>
</table>

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Request #	Addendum	RFP Section	Page	RFP	Questions/Clarification or Approved Equal	Agency Action	Agency response:
4	2	TS 81 Destination Signs	177	A destination sign system shall be furnished on the front, on the right side near the front door. Route sign on the rear of the vehicle. All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver. The driver shall be able to access the sign while seated. The destination sign compartments shall meet the following minimum requirements: Compartments shall be designed to prevent condensation and entry of moisture and dirt. Compartments shall be designed to prevent fogging of both compartment window and glazing on the unit itself. Access shall be provided to allow cleaning of inside compartment window and unit glazing. The front window shall have an exterior display area of no less than 8.5 in. high by 56 in. wide. Run number sign shall be installed.	NA	RFP Update	**DEFAULT** A destination sign shall be furnished on the front and on the right side (curbside) near the front door. The destination signs shall be Luminator Smart Series III with white LED, or approved equal. **ALTERNATIVE** Agency to select from list of available destination sign systems from OEM provided options list. **ALTERNATIVE** A rear route sign, if available, shall be installed on the rear of the vehicle. **ALTERNATIVE** A run number sign, if available, shall be installed on the vehicle
3	2	TS 84.3 Automatic Passenger Counters (APC)	179	**ALTERNATIVE** An infrared APC system shall be installed. Agency to provide details of APC system, including installation locations and number of buses to be equipped.	NA	RFP Update	**DEFAULT** No automatic passenger counter system. **ALTERNATIVE** An automatic passenger counter system shall be installed. Agency to select from list of available automatic passenger counter systems from OEM options list including installation
2	2	TS 84.4.2 Handset	180	Contractor will install a handset for driver use.	NA	RFP Update	No handset. **ALTERNATIVE** A handset for driver use shall be installed. Agency to select from list of available handsets including installation location from OEM option list.
1	2	TS 86. Computer Assisted Dispatching System (CAD/AVL)	181	There will be a requirement to furnish and install a complete automatic vehicle locating (AVL), computer assisted dispatching system as part of this proposal. The equipment provided and installed shall be manufactured and provided by Clever Devices. Each PSTA bus is equipped with various components provided by Clever Devices to include all necessary wiring and software installation. The on board computing processer unit- IVN4 is the central processing unit for each revenue service vehicle in the PSTA fleet. Along with the IVN4 each bus has an interactive Mobile Data Terminal (MDT) which Clever Devices references as a Transit Control Head (TCH). This equipment is interfaced with the bus radio, destination signs, and fare boxes to provide a central "Single Point Logon." All data is transmitted through a cellular network. Clever Devices also provides to PSTA an Automatic Vehicle Monitoring System (AVM-3) for each individual bus controlled by a central networking system. This interface monitors the major vehicle components and generates automatic reports through our Wireless Access Points (file dumping) and real-time monitoring via a cellular network.	NA	RFP Update	**DEFAULT** No computer assisted dispatching system (CAD/AVL). **ALTERNATIVE** A computer assisted dispatching system (CAD/AVL) shall be installed. Agency to select from list of available CAD/AVL systems from OEM options list including installation requirements and configuration. **ALTERNATIVE** Pre-wire only. Agency may select to have vehicle pre-wired only for a CAD/AVL system.

Revision # 2 Ordering Instructions

Each Procuring Agency will forward the executed purchase order for the buses being purchased to the OEM's and Florida Transit Association Finance Corporation (FTAFC) and cc: PSTA at purchasing@psta.net. Each purchase order will contain the pricing for any and all optional equipment and or accessories listed in the Contractor's proposal. Once the purchase order is received by the FTAFC, the FTAFC will invoice a transaction fee of $500 per bus (not to exceed $10,000 per calendar year per Procuring Agency) for an in-state Procuring Agency and a transaction fee of $1,000 per bus for an out-of-state Procuring Agency (not to exceed $10,000 per calendar year per Procuring Agency).

NOTE: Transaction Fee will be paid directly from the Procuring Agency to the FTAFC.

AGREEMENT FOR ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

THIS AGREEMENT for ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT ("Agreement") is made on_____, 2021, by and between the Pinellas Suncoast Transit Authority ("PSTA"), an independent special district with its principal place of business located at 3201 Scherer Drive, St. Petersburg, Florida, 33716 and_____("Contractor"), a_____with its principal place of business located at_____(collectively, the "Parties").

WHEREAS, PSTA issued RFP 21-980369 for Electric Transit Buses with Charging and Associated Equipment on July 14, 2021 (the "RFP"); and

WHEREAS, Contractor timely submitted its response to the RFP on or before September 14, 2021 ("Contractor's Response"); and

WHEREAS, PSTA's Board of Directors awarded the contract to Contractor at its duly held Board of Directors meeting on_____, 2021 (the "Effective Date").

NOW, THEREFORE, in consideration of the mutual promises and agreements set forth herein, and for other good and valuable consideration, the receipt and adequacy of which is hereby acknowledged, the Parties agree as follows:

1. RECITALS. The above recitals are true and correct and incorporated herein by reference.

2. CONTRACT DOCUMENTS. The "Contract Documents" shall mean and refer to this Agreement, the RFP including all exhibits attached thereto including any and all duly executed and issued addenda (attached hereto as **Exhibit 1**), any and all Purchase Orders (as defined below and attached as composite **Exhibit 2**), Contractor's Best and Final Offer (BAFO), if any (attached hereto as **Exhibit 3**), and Contractor's Response (attached hereto as **Exhibit 4**). All of the foregoing are incorporated herein by reference and are made a part of this Agreement. In interpreting this Agreement and resolving any ambiguities or conflicts between this Agreement and the exhibits, this Agreement takes precedence over the exhibits and any inconsistency between the exhibits will be resolved in the following order:

Exhibit 1	RFP
Exhibit 2	Purchase Order(s)
Exhibit 3	Contractor's BAFO
Exhibit 4	Contractor's Response

3. SCOPE OF SERVICES. Contractor, at the direction of PSTA, shall furnish to PSTA Electric Transit Buses with Charging and Associated Equipment as described in, and in accordance with the specifications, tasks, and scope of work set forth in the RFP (the "Services"), and in the amount set forth in the RFP. Contractor acknowledges that it has read the specifications and understands them. Contractor also agrees to provide electric transit buses with charging and associated equipment to all permissible assignees of PSTA. PSTA's permissible assignees shall have the option to purchase electric transit buses and charging and associated equipment in accordance with the terms and conditions of the RFP, and specifically SP 3of the RFP.

4. EFFECTIVE DATE AND TERM OF AGREEMENT. This Agreement shall become effective and commence on the Effective Date and shall remain in effect for two (2) years. This Agreement may be renewed upon written notice from PSTA for up to three (3) additional one (1) year terms (each a "Renewal Term").

5. TERMS OF PERFORMANCE.

5.01. Time for Completion/Purchase Orders. PSTA will issue purchase orders for the electric buses with charging and associated equipment it needs provided under this Agreement ("Purchase Order(s)"). Upon issuance, the Purchase Order shall be appended to this Agreement and incorporated as an exhibit, Contractor shall immediately begin providing the Services pursuant to the Purchase Order, and all work and deliverables shall be completed by the date set forth in the Purchase Order, unless modified in writing by the Parties. In the event a Purchase Order approved during the term of the Contract Term has a completion date beyond the Contract Term, the terms and conditions of this Agreement shall be automatically extended through the completion of the Purchase Order to the full satisfaction of PSTA.

5.02. Representatives. Prior to the start of any ordering or supplying the Services under this Agreement, Contractor shall designate a primary and alternate representative, who will have management responsibility for the Services and who will have authority to act on technical matters and resolve problems with the Services, Purchase Order(s), and the Contract Documents, to PSTA in writing. Such designation shall include the contact information (including phone numbers) of Contractor's representative. PSTA will advise Contractor in writing of the personnel who will represent PSTA in the administration of the Contract Documents. Such writing from PSTA may include the specific duties of each individual and each representative's limits of authority.

5.03. Non-exclusive Contract. PSTA specifically reserves the right to contract with other entities for the Services described in the Contract Documents or for similar products if it deems, in its sole discretion, such action to be in PSTA's best interest.

5.04. Contractor Responsibility. Contractor shall provide electric buses with charging and associated equipment of first quality, and the workmanship must be in accordance with customary standards of the various trades and industries involved in the manufacturing and furnishing of such products. The Servicesand the work associated therewith shall be of high-quality in all respects. No advantage will be taken by Contractor in the omission of any part or detail of the Services. Contractor hereby assumes responsibilityfor all materials, equipment, and processes used in the manufacturing and furnishing of the electric busesand charging and associated equipment, whether the same is manufactured by Contractor or purchased readymade from a source outside Contractor's company.

5.05. Compliance with Laws. Contractor shall comply with all federal, state, county, and local laws, rules and/or regulations, and lawful orders of public authorities including those set forth in this Agreement and that, in any manner, could bear on the provision of the Services under the Contract Documents. Omission of any applicable laws, ordinances, rules, regulations, standards or orders by PSTA in the Contract Documents shall be construed as an oversight and shall not relieve Contractor of its obligations to comply with such laws fully and completely. Upon request, Contractor shall furnish to PSTA certificates of compliance with all such laws, orders and regulations. Contractor shall be responsible for obtaining all necessary permits and licenses required for performance under this Agreement.

6. COMPENSATION. In consideration of Contractor's faithful performance of the Contract Documents, PSTA agrees to pay Contractor pursuant to the rates and pricing set forth in Contractor's Response or Contractor's BAFO, if any. However, all payments to Contractor individually and in the aggregate shall not exceed the Contract Total. Payment shall be made in accordance with the RFP and the Florida Prompt Payment Act, section 218.70, *et seq.*, Florida Statutes.

6.01. Invoices. All invoices shall be submitted in accordance with the Florida Prompt Payment Act, section 218.72, et seq., Florida Statutes, with all details prescribed by PSTA, and delivered to the following address:

Pinellas Suncoast Transit Authority
Attention: Finance Department/Accounts Payable
Purchase Order or Contract #: _____
3201 Scherer Drive
St. Petersburg, Florida 33716

or via electronic mail to:
AccountsPayable@psta.net

6.02. *Disputed Invoices.* In the event of a disputed invoice, only that portion so contested may be withheld from payment and the undisputed portion shall be due and payable on the terms set forth herein.

6.03. *Availability of Funds*. Contractor understands that the funds are not presently available under this Agreement beyond the current fiscal year. PSTA's obligation for performance under this Agreement beyond the current fiscal year is contingent upon the availability of funds from which payments can be made. PSTA is not legally liable for any payment that may arise under this Agreement beyond the current fiscal year, until the Contractor receives a written notice of availability of funds from the PSTA's Contracting Officer.

7. WARRANTIES AND COVENANTS.

7.01. *Patent, Trademark, Copyright, and Trade Secret.* Contractor warrants that the Services, and all goods and work associated therewith, do not infringe on any patent, trademark, copyright or trade secret of anythird parties and agrees to defend, indemnify and hold PSTA, its officers, agents, employees, trustees andits successors and assigns, harmless from and against any and all liabilities, loss, damage or expense, including, without limitation, court costs and reasonable attorneys' fees, arising out of any infringement or claims of infringement of any patent, trade name, trademark, copyright or trade secret by reason of the sale or use of any goods or services purchased under this Agreement. PSTA shall promptly notify Contractor of any such claim. PSTA makes no warranty that the production, sale or use of goods or services under this Agreement will not give rise to any such claim and PSTA shall not be liable to Contractor for any such claim brought against Contractor. If any invention, improvement, or discovery of the Contractor is conceived or first actually reduced to practice in the course of providing the Services under this Agreement, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, the Contractor agrees to notify the PSTA immediately and provide a detailed report. The rights and responsibilities of the Contractor and PSTA with respect to such invention, improvement, or discovery will be determined in accordance with applicable Federal laws, regulations, policies, and any waiver thereof.

7.02. *Covenants against Gratuities.* Contractor warrants that he or she has not offered or given gratuities (in the form of entertainment, gifts, or otherwise) to any official or employee of PSTA with a view toward securing favorable treatment in the awarding, amending, or evaluating performance of this Agreement.

7.03. *E-Verify.* Contractor shall utilize the U.S. Department of Homeland Security's E-Verify System to verify the employment eligibility of: (a) all persons employed by Contractor throughout the term of this Agreement; and (b) all persons, including subcontractors, retained or hired by Contractor, regardless of compensation, to perform work on the Services provided pursuant to the Contract Documents.

8. DELAY IN PERFORMANCE/FORCE MAJEURE.

8.01. *Time of the Essence.* The timely receipt of the Services and deliverables to PSTA is essential. If the Services and all deliverables under each Purchase Order are not received by PSTA within the date specified in each Purchase Order, PSTA may cancel the unfilled portion of the Purchase Order and this

Agreement for cause, purchase substitutes elsewhere, and recover from Contractor any increased costs and damages thereby incurred by PSTA.

8.02. Unavoidable Delay. If completion of the Services under any Purchase Order is unavoidably delayed, PSTA may, in its sole and absolute discretion, extend the time for completion for a determined number of days of excusable delay. A delay is unavoidable only if the delay was not reasonably expected to occur in connection with or during Contractor's performance; was not caused directly or substantially by negligent errors, omissions, or mistakes of Contractor, its subcontractors, or its suppliers or their agents; was substantial; and, in fact, caused Contractor to miss delivery dates and could not adequately have been guarded against by contractual or legal means.

8.03. No Damages for Delay. Contractor shall not be entitled to any claim for damages on account of hindrances or delays in the work from any cause whatsoever, including any delays or hindrances caused by PSTA. This paragraph shall include, but not be limited to, any actions which result in delays in scheduling, substantial changes in scope of the Services or deliverables or substantial increases in the costs of performing the work under the Contract Documents.

8.04. Notification. Contractor will notify PSTA as soon as Contractor has, or should have, knowledge that an event has occurred which will delay completion of the Services under a Purchase Order. Within five (5) working days, Contractor will confirm such notice in writing, furnishing as much detail as is available and including any request for extension of time. Contractor shall supply, as soon as such data is available, any reasonable proofs that are required by PSTA to make a decision on any request for extension. PSTA will examine the request and any documents supplied by Contractor and will determine if Contractor is entitled to an extension and the duration of such extension. PSTA will notify Contractor of its decision in writing. It is expressly understood and agreed that Contractor will not be entitled to any extension and the granting of such extension is in the sole discretion of PSTA. It is further expressly understood that Contractor shall not be entitled to any damages or compensation, and will not be reimbursed for anylosses, on account of delays resulting from any cause.

9. DISPUTES, BREACHES, DEFAULTS, OR OTHER LITIGATION.

9.01. Rights and Remedies. The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by PSTA or Contractor shall constitute a waiver of any right or duty afforded any of them under this Agreement, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

9.02. Attorneys' Fees. In the event of legal action or other proceeding arising under this Agreement, PSTA shall be entitled to recover from Contractor all its reasonable attorneys' fees and cost incurred by PSTA in the prosecution or defense of such action, or in any post-judgment or collection proceedings and whether incurred before suit, at the trial level or at the appellate level. This shall include any bankruptcy proceedings filed by or against Contractor. PSTA also shall be entitled to recover any reasonable attorneys' fees and costs incurred in litigating the entitlement to attorneys' fees and costs, as well as in determining the amount of attorneys' fees and costs due to PSTA. The reasonable costs to which PSTA will be entitled include costs that are taxable under any applicable statute, rule, or guideline, as well as costs of investigation, copying costs, electronic discovery costs, mailing and delivery charges, costs of conducting legal research, consultant and expert witness fees, travel expenses, court reporter fees and mediator fees, regardless of whether such costs are taxable under any applicable statue, rule or guideline.

10. INDEMNIFICATION.

10.01 Indemnification. The Parties recognize that Contractor is an independent contractor. Contractor

agrees to assume liability for and indemnify, hold harmless, and defend PSTA, its board members, officers, employees, agents and attorneys, of, from, and against all liability and expense, including reasonable attorneys' fees, in connection with any and all claims, demands, damages, actions, causes of action, and suits in equity of whatever kind or nature, including claims for personal injury, property damage, equitable relief, or loss of use, arising out of the execution, performance, nonperformance, or enforcement of this Agreement, whether or not due to or caused by the negligence of PSTA, its board members, officers, employees, agents, and/or attorneys excluding only the sole negligence of PSTA, its officers, employees, agents, and attorneys. This includes claims made by the employees of Contractor against PSTA, and Contractor hereby waives its entitlement, if any, to immunity under Section 440.11, Florida Statutes. Contractor's liability hereunder shall include all attorneys' fees and costs incurred by PSTA in the enforcement of this indemnification provision. Notwithstanding anything contained herein to the contrary, this indemnification provision shall not be construed as a waiver of any immunity from or limitation of liability to which PSTA is entitled to pursuant to the doctrine of sovereign immunity or Section 768.28, Florida Statutes. The obligations contained in this provision shall survive termination of this Agreement, however terminated, and shall not be limited by the amount of any insurance required to be obtained or maintained under this Agreement.

10.02 Control of Defense. Subject to the limitations set forth in this provision, Contractor shall assume control of the defense of any claim asserted by a third party against PSTA arising from or in any way related to this Agreement and, in connection with such defenses, shall appoint lead counsel, in each case at Contractor's expense. Contractor shall have the right, at its option, to participate in the defense of any third party claim, without relieving Contractor of any of its obligations hereunder. If Contractor assumes control of the defense of any third party claim in accordance with this paragraph,Contractor shall obtain the prior written consent of PSTA before entering into any settlement of suchclaim. Notwithstanding anything to the contrary in this provision, Contractor shall not assume or maintain control of the defense of any third party claim, but shall pay the fees of counsel retained byPSTA and all expenses including experts' fees, if (i) an adverse determination with respect to the thirdparty claim would, in the good faith judgment of PSTA, be detrimental in any material respect of PSTA's reputation; (ii) the third party claim seeks an injunction or equitable relief against PSTA; or
(iii) Contractor has failed or is failing to prosecute or defend vigorously the third party claim. Each party shall cooperate, and cause its agents to cooperate, in the defense or prosecution of any third party claim and shall furnish or cause to be furnished such records and information, and attend such conferences, discovery proceedings, hearings, trials, or appeals, as may be reasonably requested in connection therewith.

11. MISCELLANEOUS PROVISIONS.

11.01 Entire Agreement. The Contract Documents, including all exhibits, constitute the entire agreement between the parties with respect to the subject matter hereof and supersedes all previous written or oral negotiations, agreements, proposals and/or understandings. There are no representations or warranties unless set forth in the Contract Documents.

11.02 Notices. All notices required or made pursuant to this Agreement shall be made in writing and sent by certified U.S. mail, return receipt requested, addressed to the following:

To PSTA:
Pinellas Suncoast Transit Authority
Attn: Brad Miller, CEO
3201 Scherer Drive
St. Petersburg, FL 33716

To Contractor:
_____
_____
_____
_____

With required copy to:

Alan S. Zimmet, B.C.S.
Bryant Miller Olive
One Tampa City Center
Suite 2700
Tampa, FL. 33602

Either party may change its above noted address by giving written notice to the other party in accordance with the requirements of this section.

11.03 *Waiver of Remedies for any Breach*. In the event that PSTA elects to waive its remedies for any breach by Contractor of any covenant, term or condition of this Agreement, such waiver by PSTA shall only be valid if set forth in writing and shall not limit PSTA's remedies for any succeeding breach of that or of any other term, covenant, or condition of this Agreement.

11.04 *Modification.* The Contract Documents, including the scope, specification, and details of the Services may only be modified by written agreement of the Parties. No modification shall serve to increase the Contract Total unless such change has been approved by PSTA's Board of Directors prior to anywork being performed that would serve to increase the Contract Total.

11.05 *Headings and Section References.* The headings and section references in this Agreement are inserted only for the purpose of convenience and shall not be construed to expand or limit the provisions contained in such sections.

11.06 *Authorization.* Both parties to this Agreement represent and warrant that they are authorized to enter into this Agreement without the consent and joinder of any other party and that the parties executing this Agreement have full power and authority to bind their respective parties to the terms hereof.

11.07 *Assignment*. The terms and provisions of this Agreement shall be binding upon the Parties and their respective partners, successors, heirs, executors, administrators, assigns and legal representatives. Notwithstanding the foregoing, a party's rights and obligations under this Agreement may only be transferred, assigned, sublet, mortgaged, pledged or otherwise disposed of or encumbered in any way with the other party's prior written consent.

11.08 *Severability*. If any one or more provisions of this Agreement shall be held to be invalid, illegal, or unenforceable in any respect by a court of competent jurisdiction, the validity, legality, and enforceability of the remaining provisions hereof shall not in any way be affected or impaired thereby and this Agreement shall be treated as though the invalidated portion(s) had never been a part hereof.

11.09 *Electronic Signatures*. This Agreement may be executed by electronic signature technology and such electronic signature shall act as the Parties' legal signatures on this Agreement and shall be treated in all respects as an original handwritten signature.

11.10 *Counterparts*. This Agreement may be executed in one or more counterparts, any one of which need not contain the signatures of more than one party, but all such counterparts taken together will constitute one and the same instrument.

(SIGNATURES ON FOLLOWING PAGE)

IN WITNESS WHEREOF the Parties hereto have caused this Agreement to be duly executed on the date first above written.

CONTRACTOR:

By:_____

_____
Print Name:

Title:

PSTA:

By: _____
Brad Miller, CEO

Attest:

_____
Rachael Cappolla, Executive Assistant

WITNESS/ATTEST:

By:_____
Print Name:_____

Approved as to form:

By: _____
Alan S. Zimmet, General Counsel

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA)
ST. PETERSBURG, FLORIDA

ADDENDUM OF SOLICITATION

1. SOLICITATION NO.:	2. ADDENDUM NO.:	3. EFFECTIVE DATE:	4. BRIEF SOLICITATION DESCRIPTION:
RFP 21-980369	8	September 20, 2021	FLORIDA ELECTRIC TRANSIT BUSES

5. REVISED OFFER SUBMISSION DUE DATE AND TIME:
(*Note: Unless identified below, this solicitation Addendum does not change the Offer Submission Date and Time.)*

The date and/or time specified for receipt of offers is changed as follows:

DATE: SEPTEMBER 23, 2021
TIME: 10:00AM EST

6. REVISED PRE-BID/PROPOSAL CONFERENCE:
(Note: Unless identified below, this solicitation Addendum does not change the Pre-Bid/Proposal Conference, if a conference is scheduled.)

The scheduled pre-bid/proposal conference is changed as follows:

DATE:
TIME: AM/PM Local
LOCATION:

7. ADDENDUM OF SOLICITATION:
The Solicitation identified in Block 1, above, is hereby amended as described in Block 11, below. Except as provided herein, all other provisions of the solicitation, or as heretofore amended, remain unchanged and in full force and effect.

8. REQUIREMENT TO ACKNOWLEDGE ADDENDUM:
Offerors must acknowledge receipt of this Addendum prior to the deadline specified in the solicitation for receipt of offers by one of the following methods:

a. Shall acknowledge the receipt of each individual addendum in their Proposals on the form Acknowledgement of Addenda.

WARNING: Failure of an Offeror to acknowledge receipt of this Addendum, as described herein, may result in REJECTION OF THE OFFER.

***NOTE**: For Invitations for Bids the terms "Offer" and Offeror" shall mean "Bid" and "Bidder", respectively; and for Requests for Proposals or Quotation the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.*

9. FOR FURTHER INFORMATION CALL CONTRACTS SPECIALIST:

Name: Alvin Burns **Email:** aburns@psta.net **(cc:** erandle@psta.net**)**

10. DESCRIPTION OF ADDENDUM:

Please reference Box #5 for Revised Offer Submission Due Date
PROPOSAL DUE DATE HAS CHANGED FROM SEPTEMBER 21, 2021, TO SEPTMEBER 23, 2021

Exhibit 2

Pinellas Suncoast Transit Authority

Florida Electric Transit Buses with Charging and Associated Equipment

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Exhibit 3

Pinellas Suncoast Transit Authority

Florida Electric Transit Buses with Charging and Associated Equipment

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Exhibit 4

Pinellas Suncoast Transit Authority

Florida Electric Transit Buses with Charging and Associated Equipment

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 23, 2021

SECTION 1 — TECHNICAL PROPOSAL

SUBMITTED BY:
BYD Coach & Bus LLC.
1800 South Figueroa Street
Los Angeles, CA 90015

BYD CONTACT PERSONNEL:
Patrick Duan, Senior VP of Operations
P: 213.880.8597 E. patrick.duan@byd.com

John Hatch, Southeast Regional Sales Manager,
P: 407.729.0406 E: john.hatch@byd.com

Maria Mendoza, Director of Bids and Grants
P: 213.356.3660 E: maria.mendoza1@byd.com

SUBMITTED TO:
Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

THIS PROPOSAL INCLUDES INFORMATION THAT SHALL NOT BE DISCLOSED OUTSIDE OF PINELLAS SUNCOAST TRANSIT AUTHORITY. AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS PROPOSAL. IF, HOWEVER, A CONTRACT IS AWARDED TO THIS BYD AS A RESULT OF, OR IN CONNECTION WITH, THE SUBMISSION OF THIS INFORMATION, PINELLAS SUNCOAST TRANSIT AUTHORITY SHALL HAVE THE RIGHT TO DUPLICATE, USE, OR DISCLOSE THE INFORMATION TO THE EXTENT PROVIDED IN THE RESULTING CONTRACT. THIS RESTRICTION DOES NOT LIMIT PINELLAS SUNCOAST TRANSIT AUTHORITY'S RIGHT TO USE INFORMATION CONTAINED IN THIS INFORMATION IF IT IS OBTAINED FROM ANOTHER SOURCE WITHOUT RESTRICTION. THE INFORMATION SUBJECT TO THIS RESTRICTION IS CONTAINED ON ALL PAGES THAT FOLLOW.

BYD Build Your Dreams®

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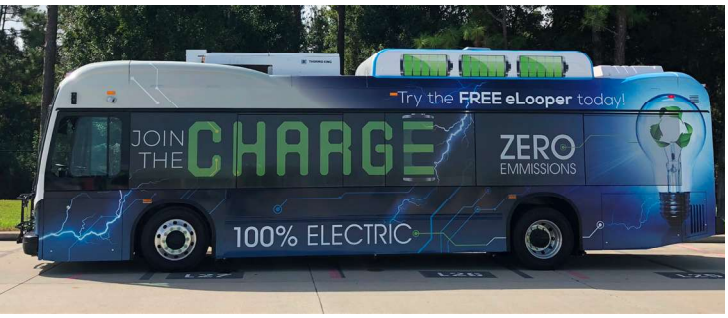

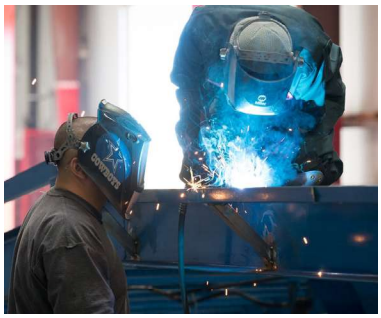


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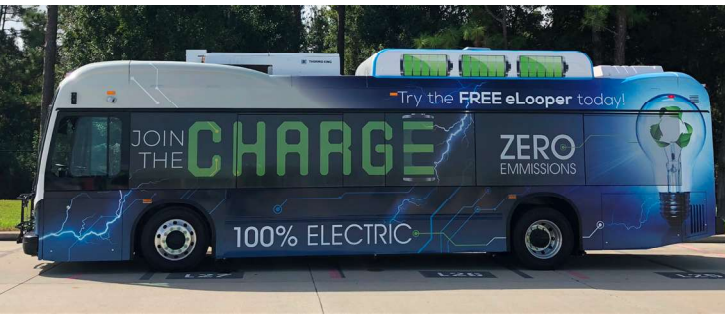
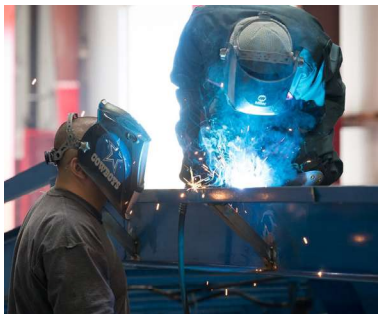





LETTER OF TRANSMITTAL

BYD Coach & Bus LLC
1800 South Figueroa Street
Los Angeles, CA 90015

213.748.3980
213.373.9801 fax
www.byd.com

September 20, 2021

Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

RE: RFP No. 21-980369 – Florida Electric Transit Buses and Charging and Associated Equipment

Dear Mr. Burns,

BYD Coach & Bus LLC. (BYD) is pleased to submit the enclosed proposal in response to Pinellas Suncoast Transit Authority's (PSTA) Request for Proposals (RFP) No. 21-980369 – Florida Electric Transit Buses and Charging and Associated Equipment. BYD stands for "**Build Your Dreams**," and we are a proud American manufacturer and innovator producing 100% Battery Electric Buses. We are dedicated to reducing overall emissions and environmental pollution.

We accept the RFP terms without exception unless specifically indicated within our technical proposal. We submit this letter in response to your RFP as a "Letter of Transmittal" and include the following information for your convenience:

1. Contact Information	BYD Coach & Bus LLC 1800 South Figueroa Street Los Angeles, CA 90015 bids.na@byd.com
2. Authorized Contact Person	Patrick Duan, Senior Vice President of Operations Phone: 213.880.8597 Email: patrick.duan@byd.com
3. Point of Contact	John Hatch, Southeast Regional Sales Manager Phone: 407.729.0406 Email: john.hatch@byd.com

This letter of transmittal is signed by Patrick Duan, Senior Vice President of Operations, who is authorized to bind BYD to terms of the proposal. We are confident that you will find our response to your RFP both thorough and fully responsive. We look forward to your bid opening and favorable response.

Sincerely,

Patrick Duan
Senior Vice President of Operations

EXECUTIVE SUMMARY

BYD COACH AND BUS

BYD is honored to present this proposal for the procurement of electric buses and chargers. After reviewing the following presentation of our qualifications and technical proposal, we are confident that you will agree that BYD stands uniquely qualified to provide you with the most technologically advanced battery-powered buses and be here 12 years from now, continuing to provide world-class support. Our goal with this Introduction of our offer is to firmly establish our overall organizational knowledge of electric buses along with our depth and breadth of vertical integration sets BYD distinctively above the competition.

OUR MISSION

BYD's mission is to make global zero-emission transportation a new **"green standard"** — for cleaner air and water, streamlined public-agency budgets, and reduced reliance on fossil fuels. We developed a sustainable approach: high-efficiency solar panels that generate renewable power stored in battery stations and used to power **safe, efficient, all-electric vehicles and enrich the quality of life for all**.

OUR HISTORY

BYD was founded in 1995 as a battery manufacturer and advanced consumer electronics company and continues to be one of the preeminent manufacturers of smartphones, tablets, and laptops for global partners such as Apple, Dell, Toshiba, Microsoft, Samsung, Motorola, and many more. ***In fact, over the past 25 years, BYD's battery technology and chemistry have been used in everyday consumer electronics by PSTA personnel.*** With an eye and vision for the future, we began manufacturing electric vehicles with cutting edge battery & electric drive propulsion technology in 2003, applying our battery and technology expertise to the manufacturing of alternative and clean public vehicles as well as other vehicles (coaches, trucks, cars, etc.). BYD's unique combination of battery and automotive experience has been revolutionizing every aspect of clean transportation ever since, with our product line of 100% electric buses, heavy-duty trucks, forklifts, passenger vehicles, and monorail systems.

In 2011, BYD established headquarters in Los Angeles County, and in 2013 we commenced our manufacturing operations in the City of Lancaster, California. This facility houses advanced engineering and cutting-edge manufacturing capabilities to produce up to 1,500 buses per year. BYD is the only electric bus manufacturer with a unionized workforce (SMART Local 105) and a Community Benefits Agreement establishing training and apprenticeship programs for workers with traditionally higher barriers to employment and mandating diversity in hiring. Additionally, BYD is over 60% of BYD investors are from the US, and Berkshire Hathaway has kept 8% of BYD stock since 2008.

Being **"The Safe Choice"** is a moniker that BYD takes pride in extending to each of its transit partners. As transportation agencies start to understand, transition, ultimately embrace battery-electric technology, agencies must have vehicle manufacture that not only understands the technology but can ensure that each bus will be purposely manufactured to be safe, cost-effective, and provide longevity to eliminate the risks. BYD is the only bus manufacturer that understands and produces its high-voltage batteries – the core element of each battery-electric bus – we can deliver full energy- and cost-effective fleet solutions that will ease your mind throughout the transit useful life of the vehicles.

Our key advantages that BYD offers to our transit partners that make us **"The Safe Choice"**:

- **BATTERY WARRANTY:** BYD warrants its batteries longer than any other bus battery – we offer our standard full 12 years that is the full transit life expectancy of the bus.
- **BATTERY SAFETY:** BYD's self-developed and -manufactured batteries are uniquely non-toxic, fire-resistant, and collision-resistant. Our batteries do not catch fire or explode even under the most extreme testing.
- **NO 20-CENTURY TECHNOLOGY:** BYD does not rely on gears and belts that frequently require replacement; with no engine or transmission needed, your bus won't waste time out of service for costly repairs.
- **VERTICALLY INTEGRATED MANUFACTURING:** BYD's the only bus manufacturer that designs and builds its buses and power source internally.
- **WORLD-CLASS AFTER-SALES:** BYD provides world-class after-sales support to ensure all customer needs are met. Local administrative support and a technician available, located in Orlando, can be on-site within 3-4 hours.
- **CUSTOMER-FIRST DESIGN:** BYD customizes the styling and design of our buses to meet your specific requirements and ensures that it meets all the federal transit administration requirements in the process.
- **FINANCIALLY SOLID:** As of 2020, BYD was valued at over $68 Billion. The financial report can be

accessed at the following site https://www.byd.com/en/InvestorAnnals.html:

Our depth of heavy-duty electric bus offerings and understanding of the core technology, combined with our customer-first design, enables us to manufacture a bus that will not only meet your specifications but be reliable and efficient for the life of the vehicle. Being a vertically integrated manufacturer provides the peace of mind that each of the key components on the vehicle purposely designs and manufactured to last. **THE SAFE CHOICE.**

THE TEAM

BYD has assembled a highly qualified and experienced team to manufacture a Battery-Electric bus to meet PSTA technical and project objectives. Our team includes key personnel and our engineering department with over 100 years of combined experience designing and manufacturing heavy-duty buses for North American Transit operations. Together our team is committed to producing quality buses PSTA and will work seamlessly from start to finish.

BYD EXPERIENCE AND EXPERTISE

BYD has also set its sights on organizational optimization to enhance its service and add **"Support"** to the list of BYD core strengths: **Safety, Sustainability, Stability, and Savings**. Facility upgrade, expansion, and recent unionization were only the first steps. Ongoing improvements include:

- Teaming with local public and private agencies to increase job outreach and career training to grow the pool of technologically qualified workers and benefit both the local community.
- Consolidating and expanding its North American customer support, to improve immediate access to field service, training, information, parts orders, and claims.
- Enhancing service by decreasing processing times while increasing its US vendor base— including more DBE and veteran-owned small businesses, as well as subcontractors within BYD's client areas.
- BYD has over 20 years of experience in developing safe, non-toxic battery technologies.

CER 1. PROPOSER'S CHECKLIST

SECTION 9: FORMS AND CERTIFICATIONS

CER 1. Proposer's Checklist

RFP [21-980369 **Electric Transit Buses with Charging and Associated Equipment**

Package 1: Technical Proposal

- ☑ 1. Letter of Transmittal
- ☑ 2. Technical Proposal
- ☑ 3. Acknowledgement of Addenda
- ☑ 4. Form for Proposal Deviation
- ☑ 5. Vehicle Questionnaire
- ☑ 6. References and non-priced information (if provided by Proposer)
- ☑ 7. Engineering organization chart, engineering change control procedure, field modification process
- ☑ 8. Manufacturing facility plant layout, other contracts, staffing
- ☑ 9. Production schedule and other Contract commitments for the duration of this Contract.
- ☑ 10. Quality Assurance Program

Package 2: Price Proposal

- ☑ 1. Letter of Transmittal
- ☑ 2. Pricing Schedule (including option buses, spare parts package, engineering, manuals, training, special tools and test equipment)

Package 3: Qualifications Package

- ☑ 1. Pre-Award Evaluation Data Form
- ☑ 2. A copy of the three (3) most recent audited financial statements or a statement from the Proposer regarding how financial information may be reviewed by the Agency
- ☑ 3. Letter for insurance
- ☑ 4. Letter for performance bond (if applicable)
- ☑ 5. Letter of commitment for parental financial guarantee (if applicable)
- ☑ 6. Proposal Form

Package 4: Proprietary/Confidential Information

- ☑ 1. Proprietary/Confidential Information

There may be items in the first three packages that are included in Package 4 because they are considered to be proprietary/confidential information. When this occurs, the Proposer must note that fact in packages 1 through 3.

DOCUMENTS INCLUDED IN SECTION 4 - PROPIETARY/ CONFIDENTIAL

DOCUMENTS INCLUDED IN SECTION 4 – PROPRIETARY/CONFIDENTIAL

The following documents as required by the RFP are included in Section 4 – Proprietary/Confidential Information for PSTA's review.

- CER 10 Performance Information/Graphs for proposed vehicles
- Battery White Paper, includes:
  - Charge Cycle and cycle life
  - Lifecycle testing procedures
  - Certification of Battery Lifecycle testing by independent testing agency
- Written Confirmation from Battery Manufacturer attesting to the following:
  - Safety of proposed battery system
- Electric Vehicle Charging Equipment
- Comprehensive Battery Warranty Terms
- Altoona Test
  - 30-FT Electric Bus
  - 35-FT Electric Bus
  - 40-FT Electric Bus (K9M)
  - 60-FT Electric Bus
- Anti-Corrosion Plan
- Quality Assurance Program
- Additional Cost Related Information
  - Additional Bus Pricing: Option Years 2 — 5
  - Additional Bus Pricing: Battery Leasing Option
  - Warranty Cost
  - K7M 12 Year Cost of Ownership

- K8M 12 Year Cost of Ownership
- K9M and K9MD 12 Year Cost of Ownership
- C10M 12 Year Cost of Ownership
- K11M 12 Year Cost of Ownership
- Training Cost
- Manual Cost and List
- Special Tools
- Spare Parts

TECHNICAL PROPOSAL

ELECTRIC PROPULSION SYSTEM

ELECTRICAL PROPULSION SYSTEM

BYD's Propulsion System was designed, engineered, and manufactured by BYD purposely for heavy-duty transportation operations. Our propulsion system consists of the primary propulsion unit, dual in-wheel traction motors, and Integrated High-Voltage Controller (IHVC).

As an industry leader in producing battery-electric buses and technology, our propulsion system has been used in more than 65,000 BEB's with over 28,000,000,000 miles driven in daily transit operations. The BYD Propulsion System has been transit industry tested and proven highly efficient, reliable, and durable.

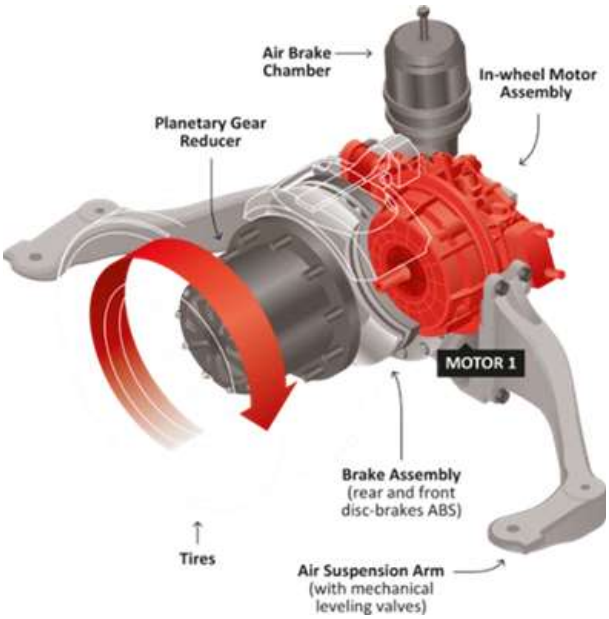
PRIMARY PROPULSION UNIT AND TRACTION MOTORS

BYD's Rear Axle is not only the axle; it includes Dual in-wheel traction motors, air brake chamber, Disc brakes, air suspension arm, and planetary gears. BYD's PPU was equipped on all BYD Altoona certified models, including 30ft, 35ft, 40ft, 45ft, and 60ft bus models. In addition, BYD's PPU has been well proven by Altoona Test.

OUR REAR AXLE ASSEMBLY ELIMINATES THE USE OF A TRANSMISSION AND OTHER MOVING PARTS THAT REQUIRE MID-LIFE OVERHAUL AND REPLACEMENT FROM CONSISTENT WEAR AND TEAR

TRACTION MOTORS

BYD's PPU utilizes racecar-inspired, twin electric, electronically controlled traction motors are located directly in the wheel hubs on each side of the rear-drive axle, along with angle-cut, planetary gear sets.



This combination of design factors removes the need for combustion, an engine compartment, a driveshaft, or a transmission—providing safer, lower-maintenance, higher-efficiency, continuous smooth motion.

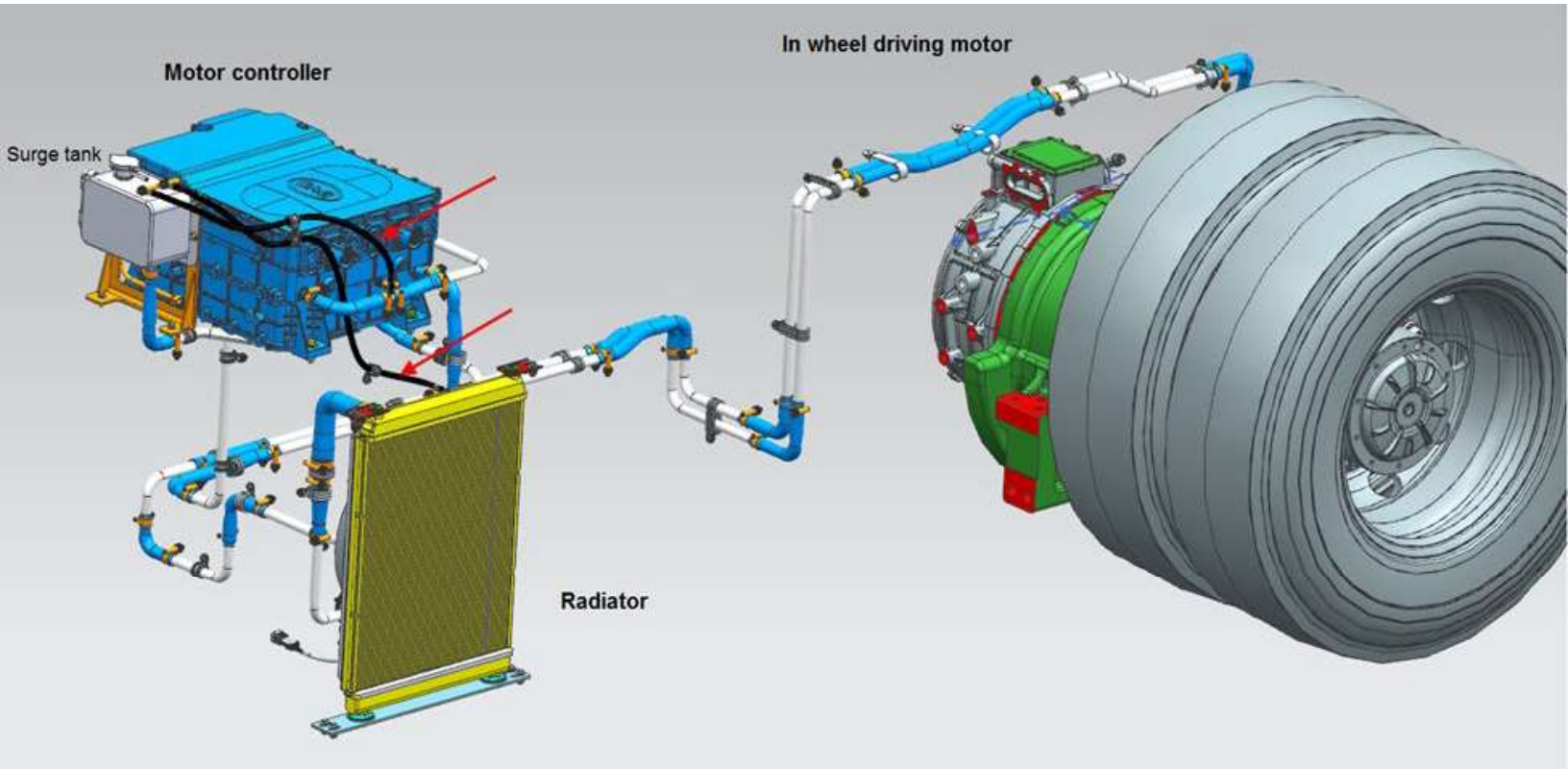
BYD PRIMARY PROPULSION UNIT TESTING

BYD puts its rear axle through an extensive amount of testing for reliability and fatigue strength to continuously improve the overall durability of the axles to meet heavy-duty transit operations and be available for over more than 12 years and 500,000 miles. Each axle that is put on a bus undergoes the following test:

TEST COMPLETED	PURPOSE OF TEST	
In-Wheel Motor Assembly Bench Test	Simulates torque and speed	
Tests based on GB/T 18488 standards	Noise, operating temperature, durability, stress resistance, and stability	
In-Wheel Reducer Bench Test	Running condition; tests sealant, noise, lubricating property, the durability of parts	
In-Wheel Drive Axle Bench Test	Simulates various operating conditions to ensure drive axle intensity and vehicle safety, including reliability demonstration with air cantilever, axle housing, half-axle tube, and the like	
Additional bench testing	• Reliability • Durability • Fatigue • Temperature • Vibration	• Environmental • Endurance • In-Service • Motor • Altoona Structural Durability

TRACTION MOTOR COOLING SYSTEM

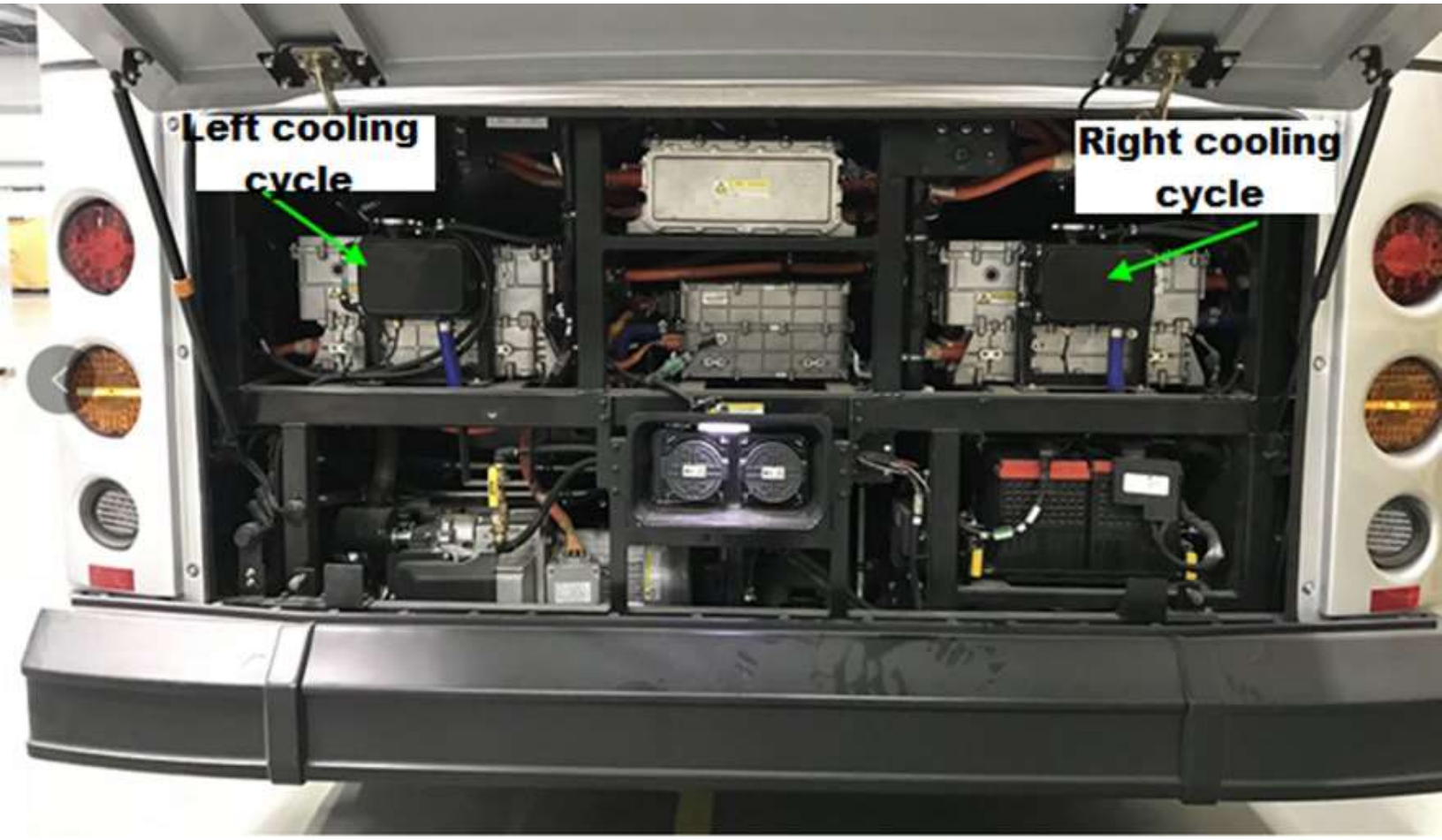
The drive system cooling system is used for cooling the driving motors, 6-IN-1 integrated High-Voltage motor controller, and the Air Compressor.



There are two cooling systems for the drive system. (This does not include the cooling system for the HV batteries.) The two systems are divided Left and Right. Each Cooling System consists of a water pump, radiators, water temperature sensor, a surge tank, and coolant hoses/pipes. BYD's 60ft articulated Bus has two independent driving motors and motor controllers, and the left and right cooling system are independent

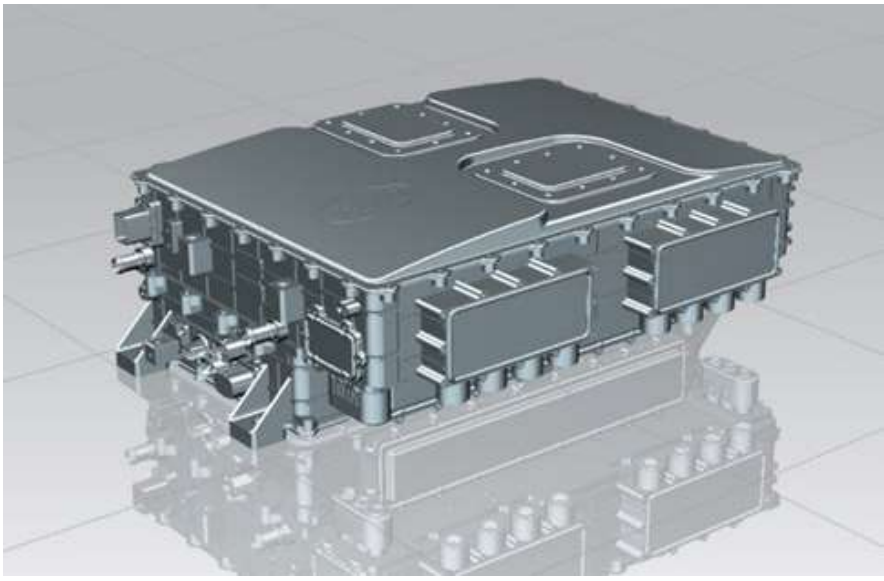
BYD's Electric buses have two independent driving motors and motor controllers, and the left and right cooling systems are independent.

Due to electrical motors' high energy conversion efficiency in BYD's electrical Bus, less than 10% of energy is lost for heat. As a result, the coolant operation temperature is only between 80F to 126F in BYD's electrical Bus.



BYD designs and manufactures our twin-radiator cooling system components, which have been sized to maintain the traction motors and high-voltage electronic components at safe, continuous operating temperatures, during the most severe possible operations, with the Bus loaded to GVWR and in any potential ambient conditions, with a 10% reserve capacity. As the manufacturer of the cooling system and the propulsion system and related components, BYD can ensure that the cooling system meets design parameters.

INTEGRATED HIGH-VOLTAGE CONTROLLER



BYD's rear-mounted enclosure houses the Integrated High-Voltage Controller (IHVC) that is multi-functional in use and has been specifically designed to regulate energy flow from the high-voltage battery system to each of the components on the Bus.

The IHVC is the hub of communication for the whole propulsion system. It is responsible for providing direct instructions and system commands to the following:

- Traction Motors.
- High-Voltage batteries.
- Charging equipment.
- And Power electronics.

The IHVC also distributes power to the following subsystems:

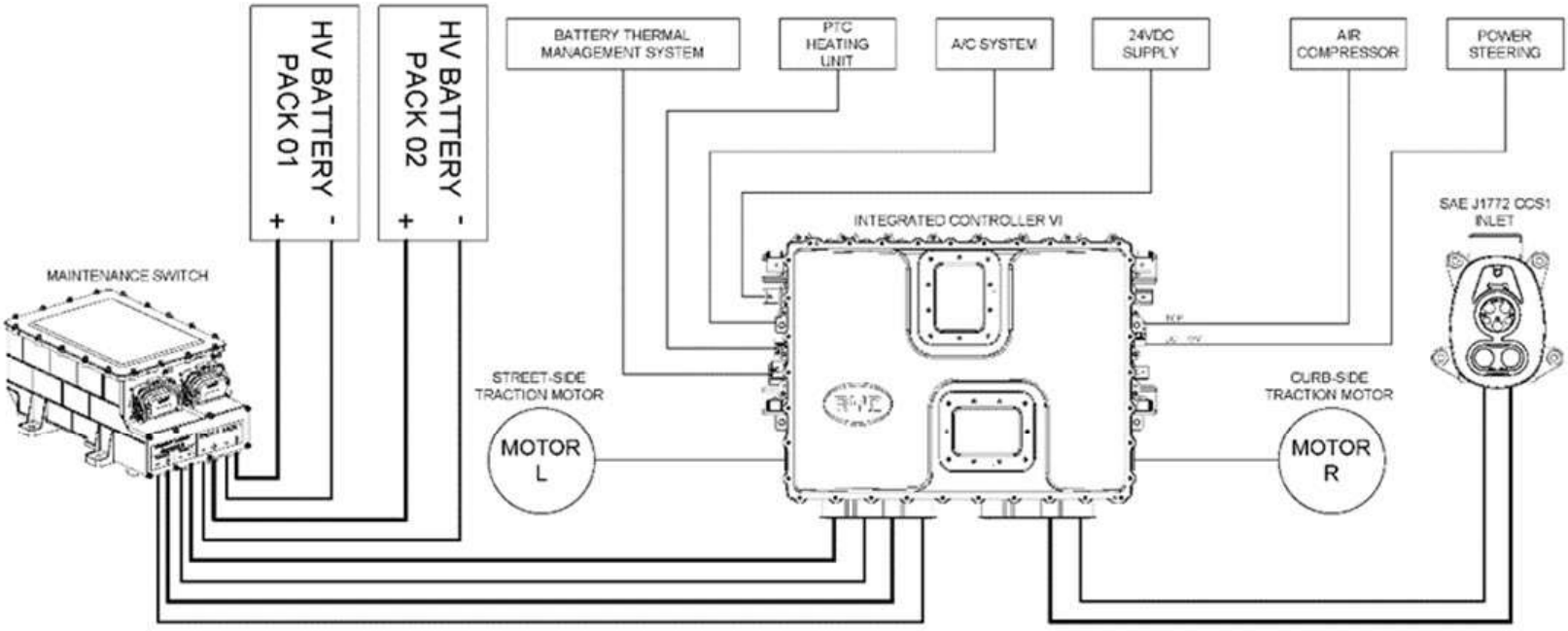
- Heating, Air Conditioning, and Ventilation System
- Power Steering
- Air System

KEY IHVC DESIGN INTEGRATION FEATURES

BYD's IHVC was designed to integrate six standard bus systems into one powerful system. It integrates:

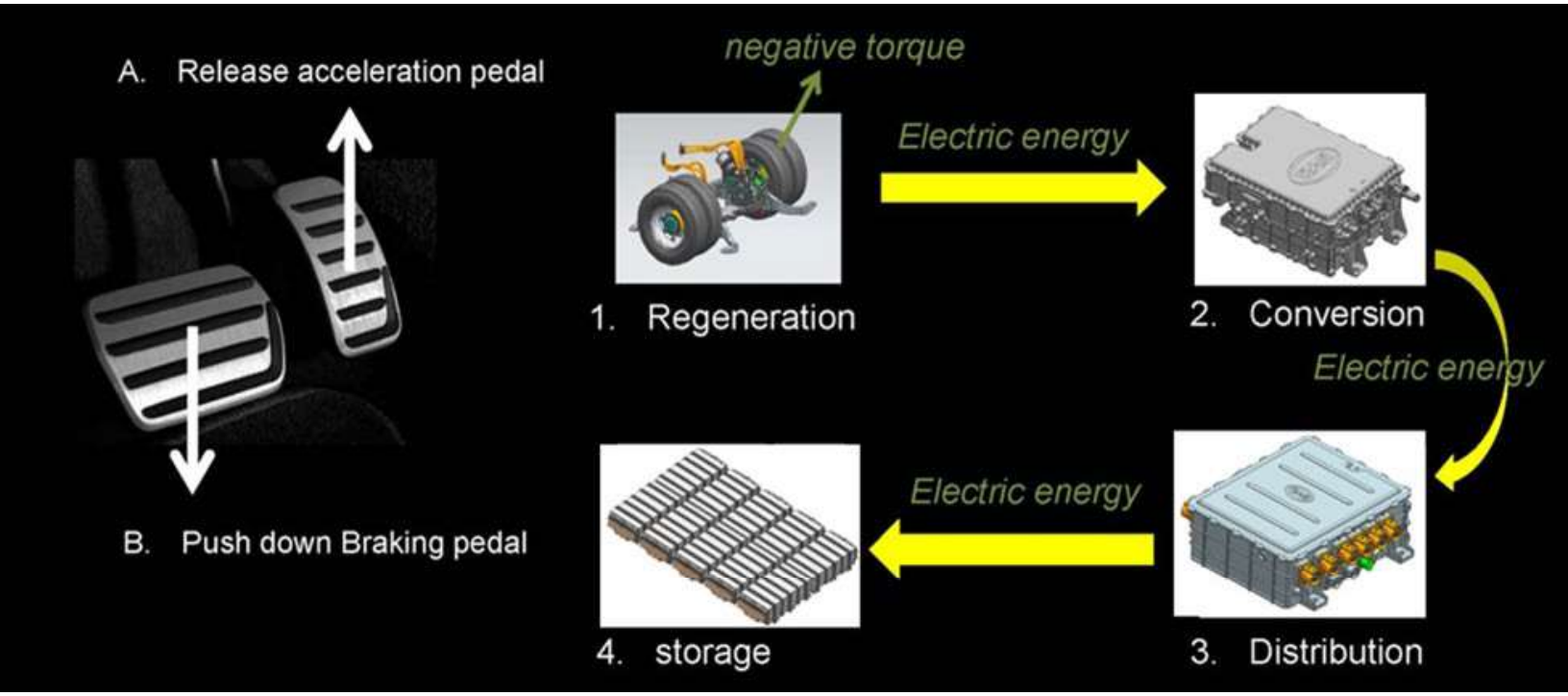
1. Air Compressor Controller
2. Steering Motor Controller
3. Drive Motor Controllers
4. High Voltage Distribution Box
5. DC-DC Converter
6. Leakage Sensor

WORKING PRINCIPAL OF IHVC



REGENERATIVE BRAKING

The Regenerative Braking function further increases energy efficiency and extends brake lining service life. Regenerative braking on all vehicle types keeps the motor's energy from being lost when the Bus slows, whether from the driver easing up on the accelerator pedal or pressing the brake pedal. Typically, an alternator transforms kinetic energy lost by the motors into electrical power.



On a BYD bus, there is no alternator because there is no need to capture kinetic energy. Since the motors are powered directly by electricity and their motion is fully electronically controlled, the Motor Controllers/Inverters receive the energy back from the motors directly as electricity. As shown below, excess AC electricity bounces back from our twin 3-Phase AC motors whenever the driver presses the brake and/or eases up on the accelerator to the twin Motor Controllers/Inverters, which invert the AC power to DC and send it through the HV Distribution Box to the ESS. The ESS then stores it for later use. Between Regenerative Braking and the placement of electrically powered, electronically controlled motors and gears directly in the wheel hubs on the drive axle, PSTA's Bus uses only as much energy as it needs to run, with almost no efficiency lost to friction.

A Regenerative Braking Disable Switch is a unique BYD safety feature; systems on other buses cannot currently be turned off in this manner. This switch provides a potentially important safety feature: if, for example:

- The driver notices that the ABS/ATC is not functioning as expected, or

- If the failsafe to prevent ESS overcharge does not seem to be working.

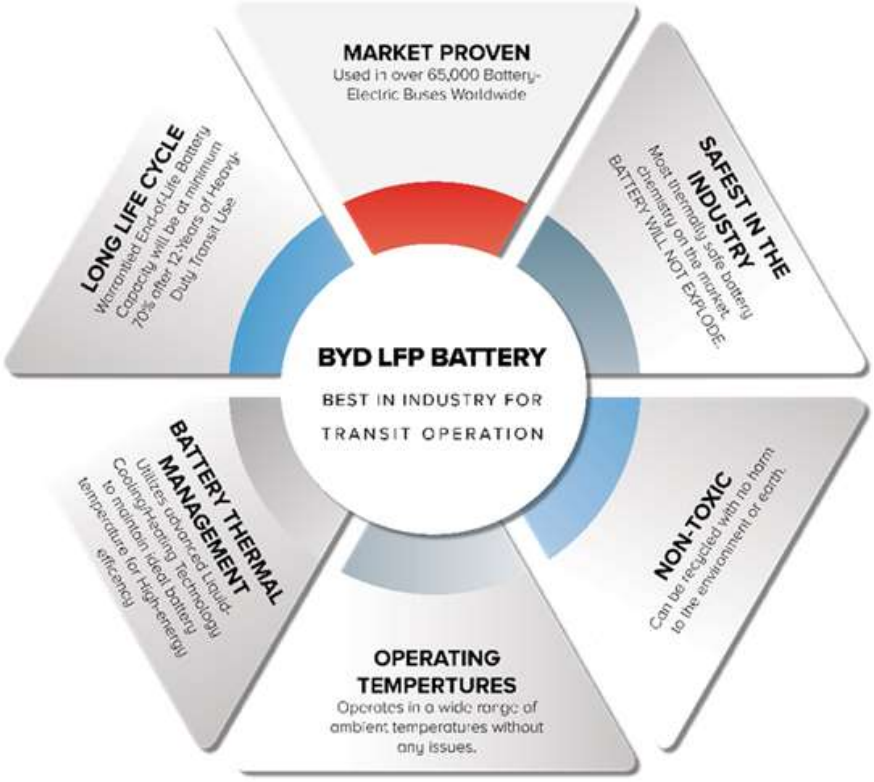
Regenerative braking parameters are programmable adjustable, and activation causes a smooth blending of both regenerative and service brake function, minimizing jerk.

Adjustable parameters include the mph at which regenerative braking will kick in; BYD will work with PSTA to pre-program these parameters to meet PSTA's optimal needs. For example, in extreme ice conditions, clients require better ABS/ATC override of regeneration.

ENERGY STORAGE SYSTEM

ENERGY STORAGE SYSTEM

The Energy Storage System (ESS) is the lifeline of BYD's battery-electric Bus. The ESS in totality consists of the following major systems: high-voltage batteries and the battery management system.



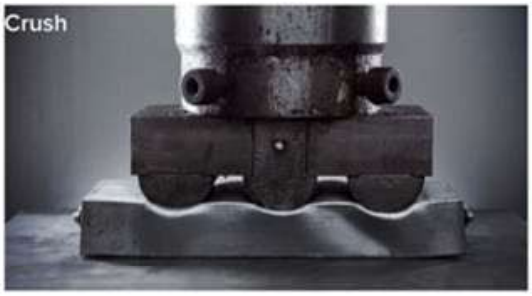
HIGH-VOLTAGE BATTERIES

BATTERY CHEMISTRY

The high-voltage batteries utilize BYD's patented Lithium Iron Phosphate (LFP) cell chemistry, which is a culmination of over 25 years of testing and research that BYD has done. As a battery manufacturer, BYD utilized its supreme understanding of battery technology to develop its LFP chemistry specifically for heavy-duty transit operations because it offers an extended life cycle, overall energy density, and safety attributes. We have attached our Battery White paper report for the agency's review.

BATTERY SAFETY

BYD's 25 years of battery research, design, and manufacturing have provided the knowledge required to build the safest battery for heavy-duty transit operations. The BYD LFP batteries have undergone the following safety test shown in Figure below.



BYD BATTERY CERTIFICATIONS

BYD's Battery System complies with SAE J2929 Safety Standard for Electric and Hybrid Vehicle Propulsion Battery Systems Utilizing Lithium-based Rechargeable Cells. Our batteries additionally meet the following certifications:

CERTIFICATION CODE	DESCRIPTION OF BATTERY CERTIFICATIONS
UL – 2580	Batteries for Use in Electric Vehicles
UL – 1642	The standard for Lithium Batteries
UN 38.3	Lithium Metal and Lithium-Ion Batteries
UN ECE R100	Battery Standards for Electric Vehicles

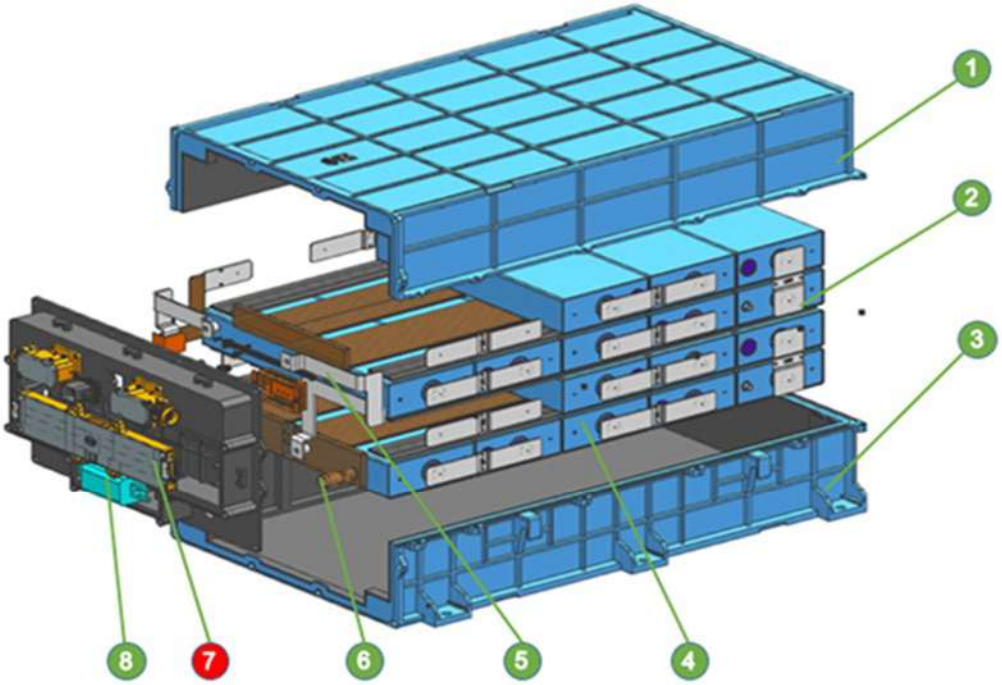
BATTERY LAYOUT

BYD's designed each of its bus platforms to have s specific battery layout to provide the following benefits for vehicle operation:

- Better distribution and balance of weight on the vehicle
- Maximize passenger space on the vehicle
- Ease of maintainability and access for service

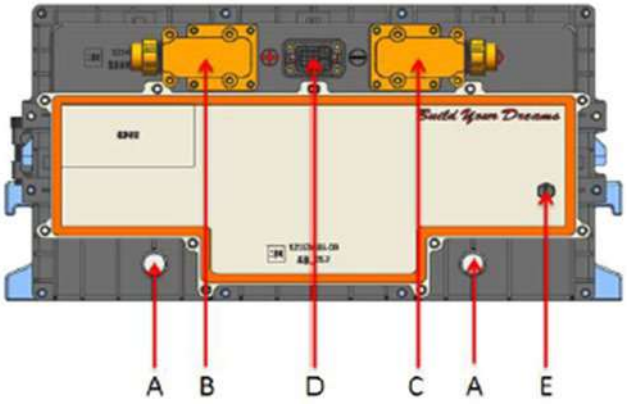
BYD BATTERY MODULES

Proper design of the cell, battery, and battery compartment ensures optimum, reliable, and safe operation. BYD designed and built our battery modules and packs utilizing our proprietary LFP battery chemistry that provides high energy density and BYD's Battery Management System technology to maintain peak performance to produce a more extended daily vehicle range.



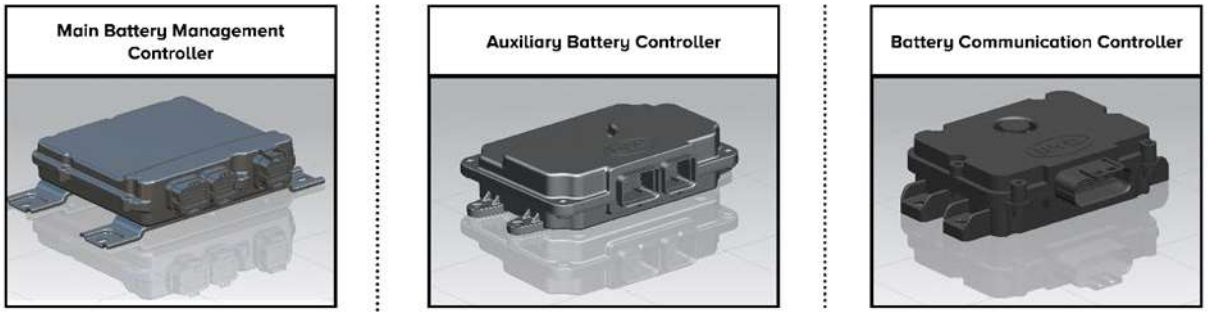
1. Top Cover
2. Bridge Plate
3. Bottom Cover
4. Battery Cell
5. Module Harness
6. Coolant Pipe
7. Battery Information Collector(BIC)
8. Fuse

NO.	DESCRIPTION
A	Cooling Water Pipe Connection
B	Positive High-Voltage Connector
C	Negative High-Voltage Connector
D	Low Voltage Connector
E	Exhaust Vent



BATTERY MANAGEMENT SYSTEM

The BYD Battery Management System (BMS) was designed, developed, and manufactured by BYD. Our BMS system has built-in Smart Technology to manage, monitor, and calculate critical system information for the entire ESS. The BMS consists of a Main Battery Management Controller (BMC) per Bus, Auxiliary BMC per battery pack, and Battery Communication Controller (BCC).



Since BYD's BMS is part of our vertical manufacturing process, it seamlessly integrates into our "one bus" vehicle design. The BMS utilizes Controller Area Network (CAN) communication to transfer information from the individual cell level to the overall battery packs to generate real-time vehicle monitoring.

The BMS offers the following distinct advantages:

- **Smart Charging System:** Enables the High-Voltage Batteries to charge the Low-Voltage Batteries, which supply a consistent vehicle ignition power resource.
- **Battery Thermal Management:** Monitors and reports the temperature of each pack, Module, and cell on the vehicle to provide a safer bus.
- **Cell Balancing:** Monitors and calculates the voltage levels of the battery cells to maintain consistent battery function throughout the cells.
- **State of Charger (SOC) Calculations:** Calculates the overall vehicle SOC for a more energy-efficient use of power.

BATTERY COOLING AND HEATING

Maintaining the battery temperature on the vehicle is vital to maintaining a safe, reliable, and efficient transit service. That is why BYD has taken extensive measures to design a battery cooling and heating system ideal for bus applications. To protect our batteries for the life of the vehicle, BYD has designed our battery packs with the following protections:

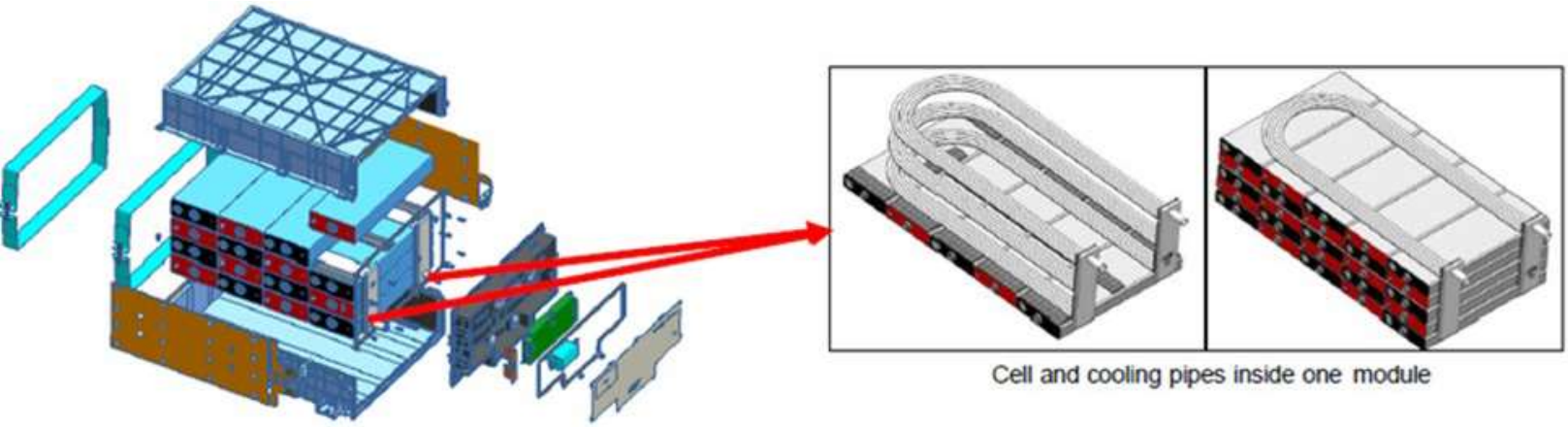
1. **Built-In Battery Thermal Management:**

   Battery Thermal Management is an integral part of BYD's BMS. Our design utilizes the same sensor and system as our BMS to:

   - Monitor battery Temperature
   - Provide automatic shut-off for any cell that overheats

2. **Piped-Liquid Cooling/Heating Control:**

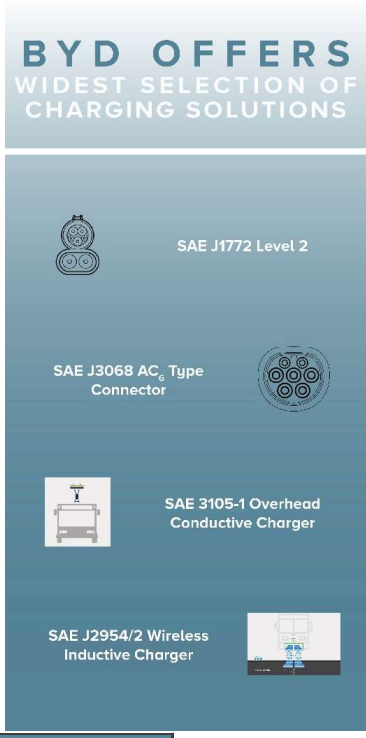
   BYD's battery modules have a built-in piped liquid cooling system. Figure 6 shows the design of the Piped-Liquid cooling/heating system in the Module. It keeps the battery cell at an ideal temperature during the winter and summer months.



Cell and cooling pipes inside one module

VEHICLE CHARGING SOLTIONS

VEHICLE CHARGING SOLUTIONS



Each of BYD's buses supports SAE charging standards J1772. In addition, each Bus comes standard with a single manual charging port located at the rear curbside of the Bus that meets the SAE J1772 CCS Type 1 North American standard for plug-in charging. Additional options are available for dual charge ports located either on each rear side of the Bus.

PSTA can utilize any J1772 CCS Type 1 or SAE J3068 AC_6 Type Connector plug-in charger to charge its vehicles, and BYD's buses can also support J3105 (overheard pantograph) charging and J2954/2 (wireless inductive charger).

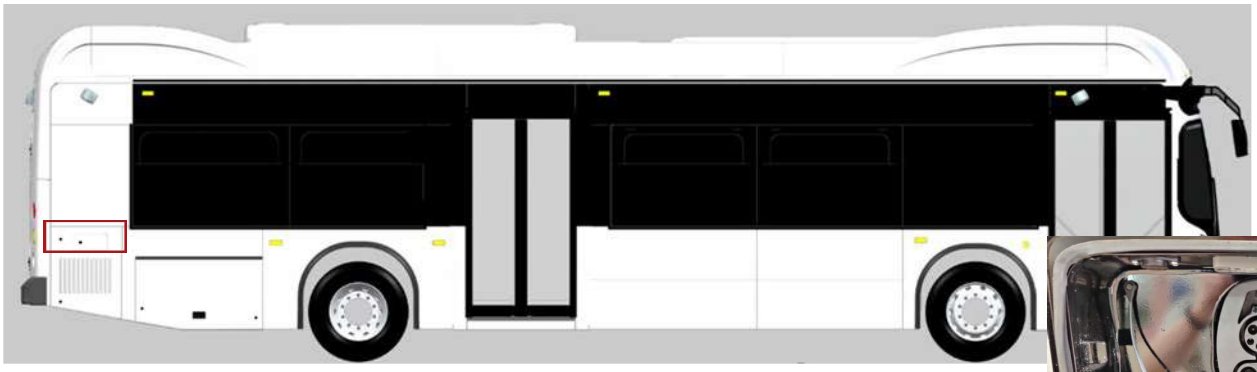
PLUG-IN CHARGER OPTIONS

BYD offers two plug-in charging solutions to provide overnight or intermittent depot charging. In addition, we offer both AC and DC plug-in charging solutions.

	BYD AC CHARGER	BYD DC CHARGER	MULTIPLE DC VENDORS
Manufactuer	BYD	BYD	DC Charger Vendors
Charging Mode	AC	DC	DC
Connector Type	IEC62196-2 Type 2	SAE J1772 CCS Type 1	SAE J1772 CCS Type 1
Maximum Output Power	40kW x 2	150kW	150kW
Max Current/Connector	48A x 2	200A	200A
Voltage	480V	400V	400V
Dimensions	27” x 15.5” x 8”	30” x 48” x 75”	Varies by Vendot

CHARGER LOCATION

BYD's plug-in standard design for the charging receptor location is the curbside rear of the Bus. The Figure below shows the location. BYD can work with each transit agency to locate in a different location if desired.



*Note: Once charging has started, the vehicle's built-in safety mechanism will activate to ensure that the plug-in connector will remain connected to the vehicle until charging is completed or manually stopped. Furthermore, the Bus's propulsion system will be deactivated to keep the vehicle from moving.

OVERHEAD PANTOGRAPH

Additional vehicle charging can be completed by using an overhead charging system solution utilizing the SAE J3105-1 connections. Roof-mounted overhead conductive charging equipment can be used either as the primary charging or as an opportunity charge during vehicle layover time for additional SOC. Utilizing this system can add up to 75kWh of additional SOC per 10 min. of charge using the maximum 450kW charging power.

WIRELESS INDUCTIVE CHARGING

BYD can be equipped with wireless inductive charging solutions from each equipment manufacturer utilizing SAE J2954/2. In-ground wireless inductive charging can be used as an opportunity charge during vehicle layover time for additional SOC. Using this system can add up to 50kWh of additional SOC per 10 min. of charge using the maximum 300kW charging power.

BYD is fully compliant with SAE J2954/2 wireless inductive charging positions on the vehicles. The Figure below provides the approximate location of the on-vehicle charging equipment.

EXPORTABLE POWER SOLUTIONS

EXPORTABLE POWER SOLUTIONS

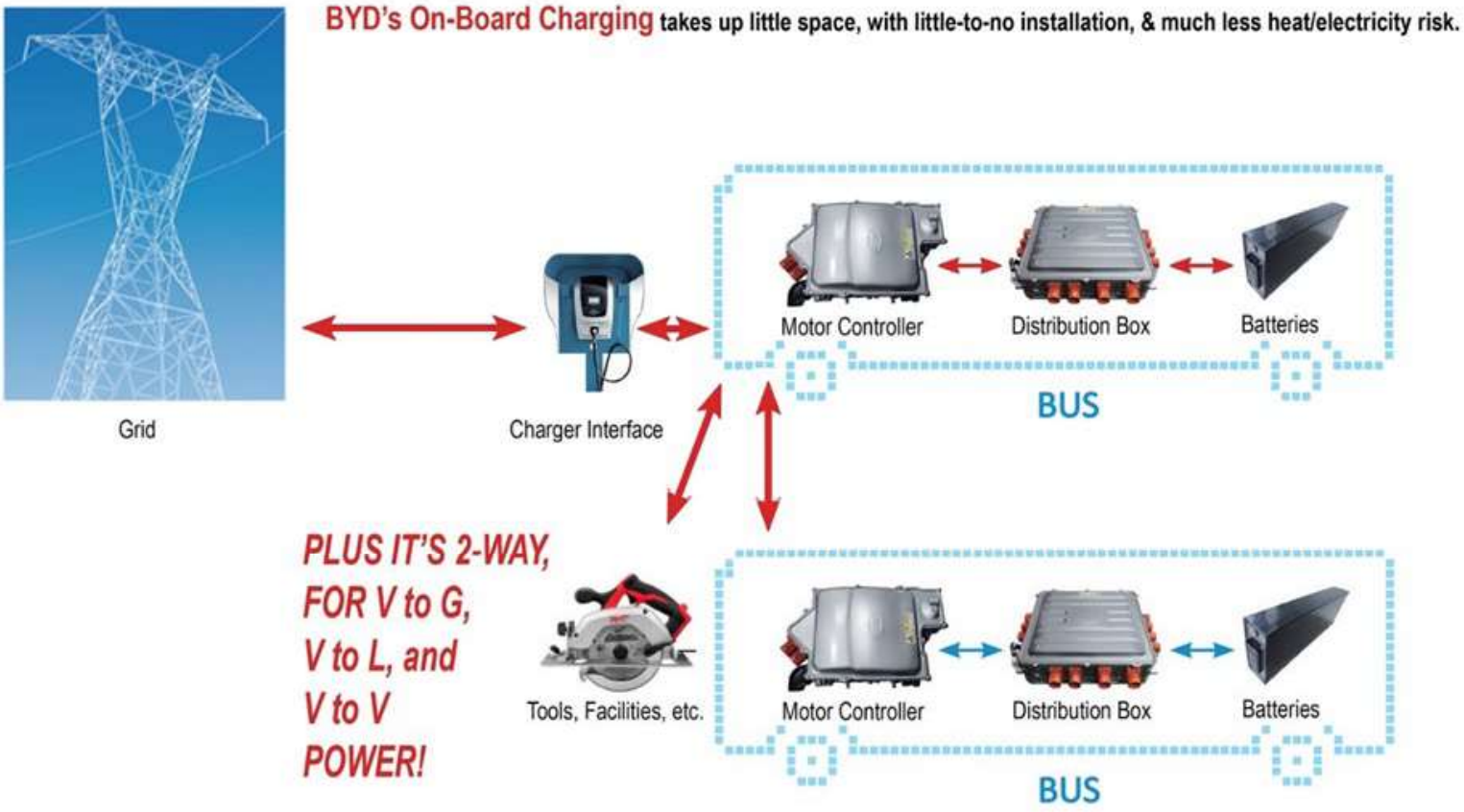
Utilizing BYD's AC charger provided flexible power use options that are an added advantage.

The following provides more detail on how our charge system design offers you greater flexibility to continually revise your charging and power use to meet changing needs:

Easy Installation/Potential Portability: BYD charging interface can be easily wall-mounted or pole-mounted to the floor, using simple bolts. The connection to the 3-Phase, 480 VAC outlet is usually hidden in the wall or underground but does not need to be, so long as appropriate workplace and/or public safety measures are taken, including protection for the connection at the outlet and precautions against trip hazards (if the large connecting cable may be out on the ground). BYD charging interface can even be kept portable by mounting them on wheeled platforms or onto service trucks also equipped with generators for emergency boosts anywhere. If they are installed, they can be easily unbolted and reinstalled (re-bolted) in a new location any number of times. In addition, since they are vandal-resistant and can come with a weather-protective cover, this location can be almost anywhere with an appropriate power source and room to park a bus.

This flexibility opens up a wealth of possibilities for a partnership that you might develop with other public or private entities, such as to put chargers at key destinations like colleges, malls, or sports/entertainment venues, either permanently or temporarily as part of public relations campaigns to support transit and green technology.

Bi-Directional Charge Flow: BYD's charging system controllers offer the ability to discharge power off of any BYD bus and other BYD electric vehicle to several different destinations: the power grid, another vehicle, or to an energy storage system or even through an outlet to power tools, equipment, or even facilities from the Bus.



This feature allows each BYD vehicle to act as a mobile generator:

- **Vehicle to Grid (VtoG):** This function provides power back to the grid or a large energy storage system. This provides you with flexible power options, including:
  - **If there is a community power shortage,** you can return power gathered during off-peak periods for peak rebates and help critical facilities such as hospitals and retirement homes.
  - **If there is a grid power outage,** BYD's buses can be connected to the grid to form a large virtual energy storage system.
- **Vehicle to Load (VtoL):** This function can send power to loads, providing different options:
  - **Store energy in storage systems** for later use during peak periods or in emergencies;
  - **Use bus power to send energy through outlets or connectors** that can be provided onboard, power tools/equipment on the road, or even key facility functions in a blackout.
- **Vehicle to Vehicle (VtoV):** This function allows you to use any BYD bus or BYD electric vehicle to

power any other BYD bus or BYD electric vehicle directly. This offers amazing flexibility, such as the ability to:

- **Minimize towing**: In the unlikely event that a bus runs out of power during service, the Bus that comes to pick up the passengers could provide a quick-boost charge to the first to enable it to reach a nearby depot. Alternately, a BYD electric service truck could come out to boost the Bus, rather than tow it (an extra charger mounted to a regular service truck with a generator would achieve a similar result).
- **Allow scheduled boosts:** Some agencies, for certain routes, could schedule deadhead times at key route connection points, such that a bus with a heavy day's service could receive an appropriately-timed boost from a bus with a less demanding service day.
- **Allow in-depot boost options:** Any BYD vehicle, including another bus, an electric service truck, or an electric forklift, could be used in place of your low-voltage charger to provide a quick boost to a bus at any of your facilities.

VEHICLE DATA AND HEALTH MONITORING SYSTEM

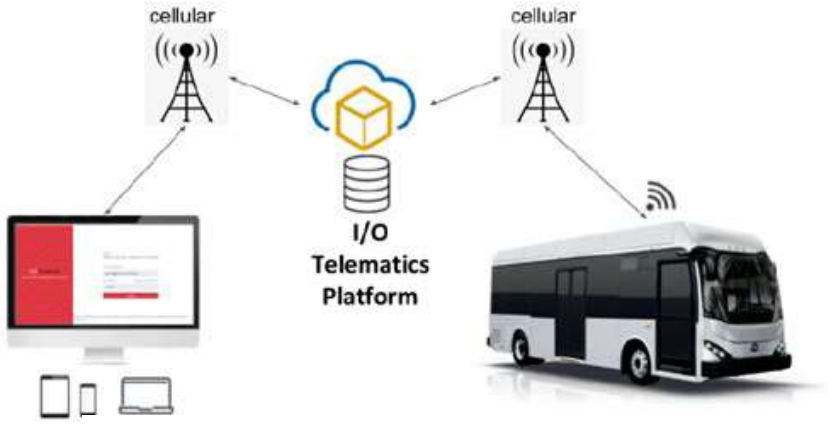
VEHICLE DATA AND HEALTH MONITORING SYSTEM

BYD developed its data, health monitoring, and energy management systems, HAMS, and ELMS, with I/O Controls Corporation, a web-/cloud-based solution real-time monitoring of both the driver and vehicle performance on an individual vehicle and fleet-wide basis as well as complete charge management.

BYD HAMS

HAMS generates data on each vehicle in the fleet to improve driver safety, driving performance, and overall fuel economy. In all HAMS provide the key features and functionality:

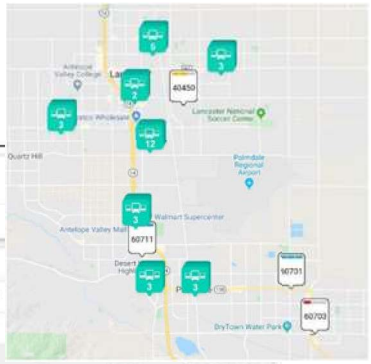
- **Alert:** When the vehicle requires immediate attention, text and email messages are sent. Alerts are vital if a vehicle encounters issues during a charging cycle or revenue service.
- **Manage:** Use cloud-based software to manage, configure and edit the information supplied by the HAMS module.
- **Inquire:** Health status (SOC, mileage, battery voltage, other defined J1939 messages, etc.) is updated once per minute.
- **Store:** Monitor and log the health status of vital and key subsystems. Data may be uploaded to the cloud for future use

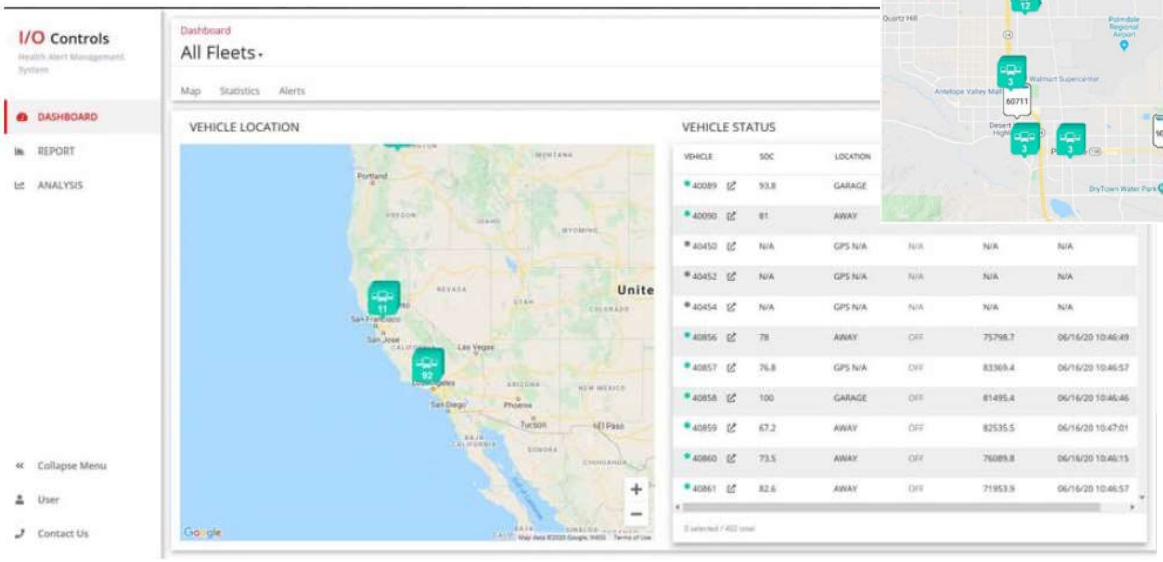


THE HAMS SOFTWARE IS USEFUL AS A CONTROL CENTER TO MONITOR THE SOC AND GPS LOCATION OF ANY VEHICLE IN THE FLEET, AT ANY TIME DURING CHARGING AND REVENUE SERVICE. EXTERNAL API ACCESS IS SUPPORTED.

FLEET DASHBOARD VIEW

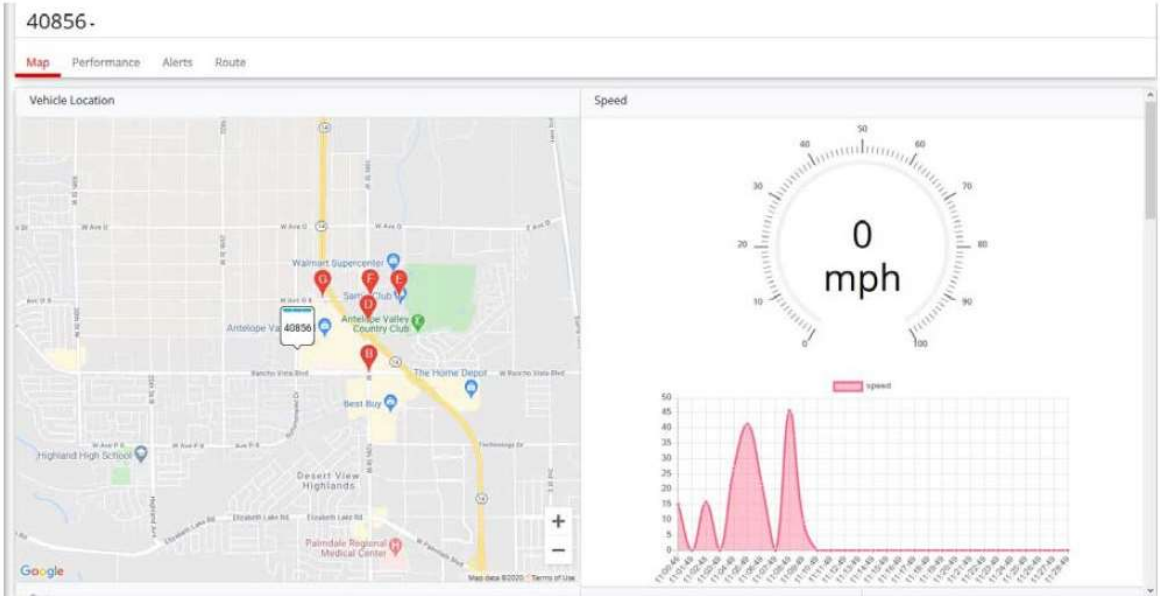
HAMS displays an "All Fleet Map" that shows each vehicle status in the fleet that currently includes location, the current state of charge (SOC), current mileage, current charge status, and time of the last update.





VEHICLE DASHBOARD VIEW

The individual vehicle dashboard displays real-time for a specific vehicle in the fleet. In addition, it displays the following information: SOC, location, fuel efficiency, and range remaining on a single charge.

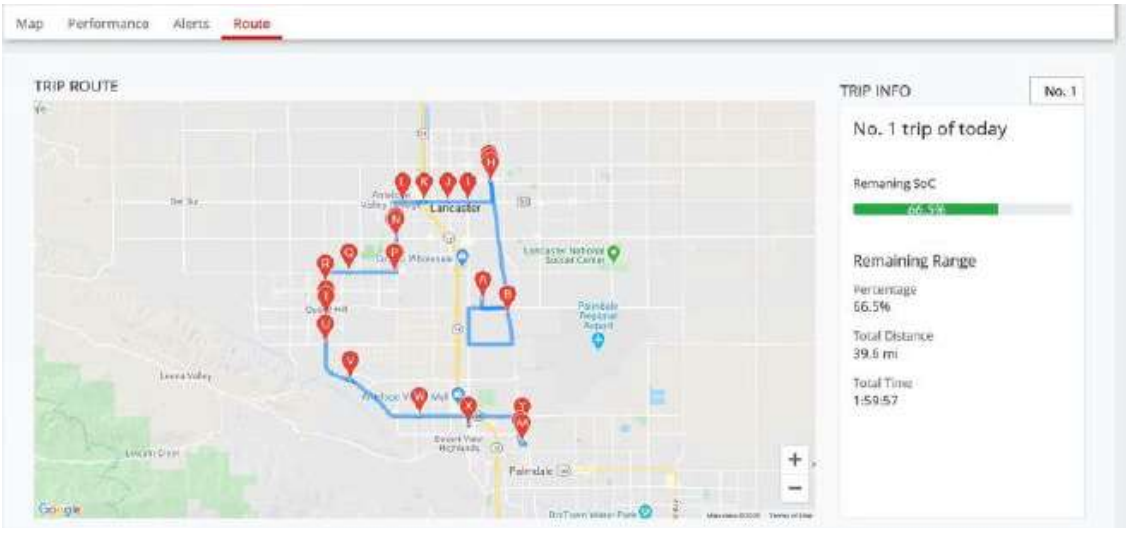


Additional information provided within the vehicle dashboard included:

- **Performance:** Displays the overall performance of the electrical performance of the vehicle. That includes battery temperature, total energy consumed, and average speed.

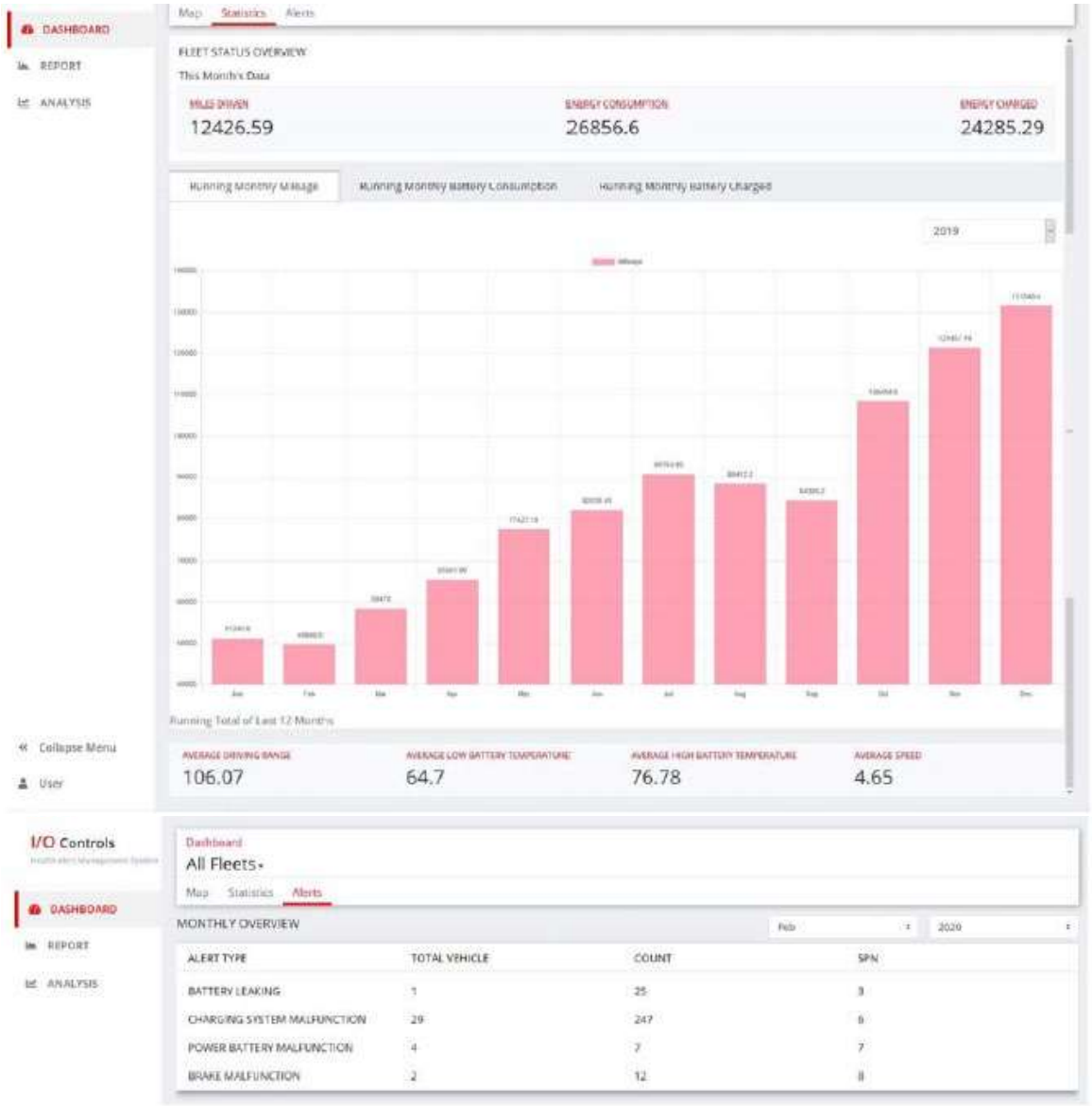
- **Alerts:** Shows all the vehicle alerts. For instance, when the SOC is below 20%, the charging system malfunctions, brake malfunctions, or other critical information on the vehicle.

- **Route:** Shows the route of the current vehicle, including remaining SOC, total distance traveled, and total time on the route.



FLEET ANALYSIS

The HAMS also provides historical data from the entire fleet to the individual vehicle in graphic printout over time. The fleet analysis display shows running yearly, monthly, or daily mileage, battery consumption, and battery charge. Also, agencies can view all fleet alerts by clicking on the alerts tab.



This information can be filtered by a given year and month to show historical records of the fleet's performance.

REPORTS

HAMS generates reports to show data for all, some, or one vehicle graphically to show the overall vehicle performance for the day, week, month, or year. The agency can select the following parameters for its reports:

- **Energy Charged**
- **Energy Used in Service**
- **Energy Used in Idle**
- **Energy Regeneration**
- **SOC Charged**
- **SOC Used in Service**
- **SOC Used in Idle**
- **Miles Driven**
- **Remaining Range**
- **Average Speed**
- **Average Speed in Service**

The information presented in the report can be emailed or downloaded directly for full analysis.

ELECTRIC BUS OPERATING RANGE

ELECTRIC BUS OPERATING RANGE

Based on RFP and Addendum feedback, BYD needs to provide Altoona On-Road Energy Consumption, and Range Tests requested in TS 8.1.

Below is the data:

The fuel economy data are obtained at the following conditions

1. Air conditioning off
2. Seated load weight during coast down
3. Exterior and interior lights on
4. Defroster off
5. Windows and Doors closed

BUS MODEL	USABLE BATTERY CAPACITY	DUTY CYCLE	ENERGY CONSUMPTION(KWH/MI)	NOMINAL RANGE(MILES)
30ft	266kWh	Manhattan cycle	1.81	146
		Orange County Bus Cycle	1.39	191
		EPA HD-UDDS Cycle	1.53	173
35ft kWh	391kWh	Manhattan cycle	2.453	159
		Orange County Bus Cycle	1.737	225
		EPA HD-UDDS Cycle	1.923	203
40ft(K9M)	313kWh	Central Business District (CBD)	1.994	156
		Arterial (ART)	2.536	123
		Commuter (COM)	1.427	219
40ft(K9MD)	446kWh	Manhattan cycle	2.52	176
		Orange County Bus Cycle	1.93	231
		EPA HD-UDDS Cycle	2.12	210
45ft	446kWh	Manhattan cycle	2.96	150
		Orange County Bus Cycle	2.27	196
		EPA HD-UDDS Cycle	2.49	179
60ft	578kWh	Central Business District (CBD)	3.236	178
		Arterial (ART)	3.744	154
		Commuter (COM)	2.093	276

VEHICLE MAINTAINAILITY

VEHICLE MAINTAINABILITY

One of the primary design goals of BYD's Low-Floor Electric Buses being proposed is to maximize the maintenance accessibility. A direct measure of this goal is the number of person-hours required to maintain each of the vehicles.

VEHICLE MAINTENANCE

First, BYD's major components used to power the Bus is designed and produced by BYD. BYD's buses utilize BYD's proprietary battery-electric propulsion system and drive train without using a standard transmission or other components used on a typical combustion engine. Leveraging our ability to produce these components allows BYD to have a complete understanding of how each of our components will best integrate into our entire bus system to provide the minimal amount of Preventative Maintenance needed to maintain our vehicles.

BYD has designed our buses maintenance components to be easily accessible. For example, the large rear high voltage electronics compartment door, large A/C interior grill with hinges, street and curbside radiator doors, and curbside battery rear battery compartment door have been designed to reduce maintenance hours by increasing access to each of these compartments of Maintenance personnel.

BYD has purposely designed our interior destination sign door that tailors directly to quick and direct access to the sign and window cleaning. In addition, we have placed the multiplex electrical system that can be accessed from the inside of the Bus within the electrical compartment area directly to the rear of the driver area and at the rear bulkhead.

BYD designed our buses with our customers in mind. We have ensured that any maintenance actions that need to be undertaking by our customers on our buses do not cause add person-hours or confusion that could lead to our customers having added fear or trepidation with electric buses. Our goal is to provide a reliable bus in vehicle performance, durability, safety, and cost-effectiveness in maintenance matters.

BYD believes that offering our customers next-generation technology does not have to provide next-generation complexity when it comes to maintenance. That's why BYD has designed each of our buses with our customers in mind to keep each Bus maintenance-friendly without compromising our innovative technological advances in transit bus evolution.

PREVENTATIVE MAINTENANCE INTERVALS

BYD's Preventative Maintenance (PM) schedule is based on intervals of 6,000 miles (except for specific major component requirements) beginning at 6,000 miles. BYD understands that many transit properties elect to use intervals of 3,000 miles; however, BYD's bus design minimizes the number of moving parts on the Bus, which affords transit properties the added value of adhering to the standard 6,000-mile intervals. BYD further recommends that the assigned driver perform a daily inspection of each Bus. This daily inspection checklist is often drawn from a portion of the PM program.

On average, the typical time to handle daily inspections is 10 minutes, and the time to conduct brake inspections is 15 minutes.

According to PM information gathered from BYD and our customers, BYD has compiled our PM schedule into three different tier levels A, B, and C. The A level is our standard PM inspection for every 6,000 miles. The B level is our inspection at 18,000 miles, including the first changing of only the Gear Oil. And the final C Level is at 36,000 miles, which includes changing both the gear and motor oils. The following are estimates that would apply to the following activities:

- The 6,000-mile inspection is estimated to take 3.5 person-hours.
- The 18,000-mile inspection is estimated to take 6 person-hours.
- The 36,000-mile inspection is estimated to take 8 person-hours.

BYD believes that PM inspections should not overuse person-hours that causes transit properties to have to keep their buses out of service for a total day. By having an advanced yet simple design for each of our buses, we can have each Bus continue to do what they are built for, to continue to offer full service to each rider within a community.

MEANTIME TO REPAIR

BYD has designed our transit buses to require a minimal amount of mean time to repair (MTTR) for all our components in the event of failure. In addition, our design allows for convenient accessibility for transit maintenance personnel to handle repairs of components after their warranty period has expired. Through our lessons learned from our current customers and Customer Service Department training courses on our vehicles, we have tabulated the expected times for repair for each component on our vehicle. Given that each transit property will have regularly available tools and equipment.

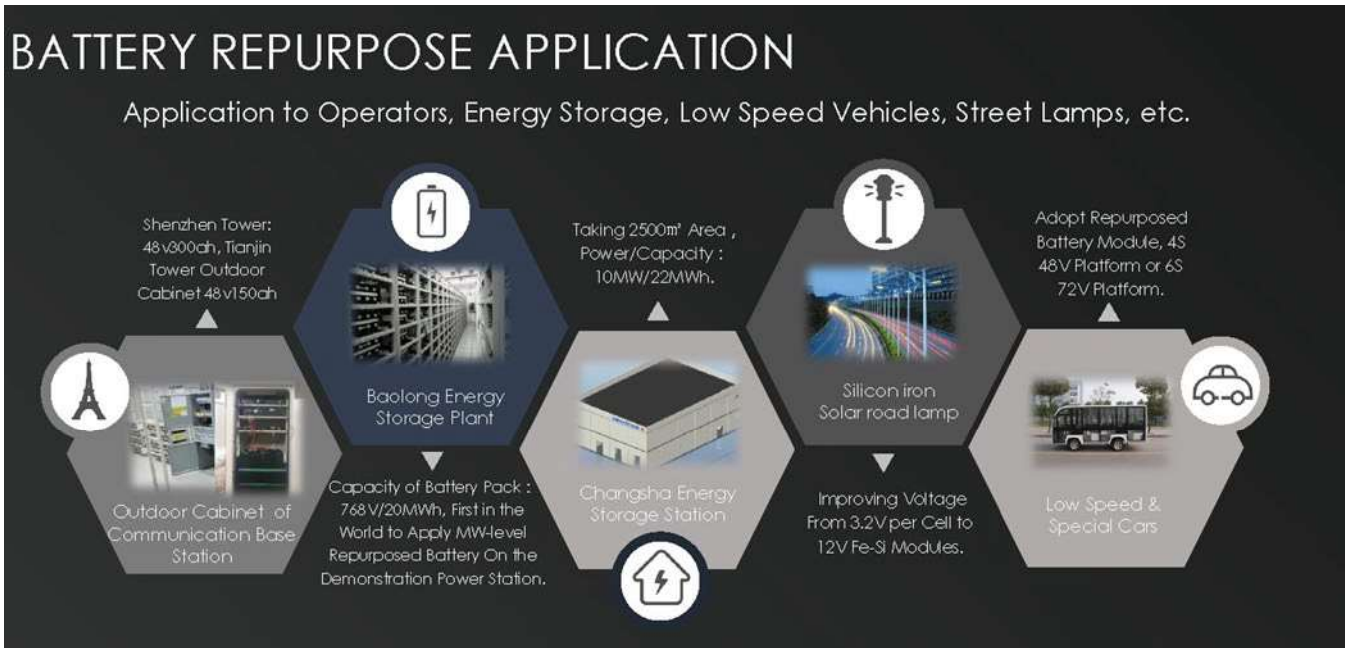
SERVICE TASK	BYD MTTR (HR., MIN.)
REMOVE AND REPLACE	
A/C Blower	0.7 hr.
A/C Condenser Motor	1 hr.
Access for Door Motor Adjustment	< 2 min.
Air Compressor	2.4 hrs.
Air Dryer Desiccant	15 min.
Batteries (Set)	30-45 min./pack
Brake Application Valve	0.3 hr.
Destination Sign System	1.5 hrs.
Driver's Seat	0.7 hr.
Electronics Unit (Regulator, PLC Module, Relay, Fuse, etc.)	15 min.
Exterior Mirror Glass	5 min.
Headlining Panels, Interior Individual (Less Handrails)	1 hr.
HVAC Unit (Complete System)	8 hrs.
Lamps, Passenger Lights	15 min.
Motors on BYD Drive Axle	4.5 hrs.
Motor Controllers/Inverters	1.5 hrs.
Power Steering Gear Box Assembly	1 hr.
PPA Mounts, Complete Set	2.8 hrs.
Radiator (2 mechanics)	2.4 hrs.
Seat Insert	< 1 min.
Shocks, Each	1.4 hrs.
Wheel Change, Front	0.9 hr.
Wheel Change, Rear Dual	0.9 hr.
Window Glazing, Passenger	1 hr.
Window Guard, Passenger Window and Door (If required)	6 min.
Wiper Motor	0.6 hr.

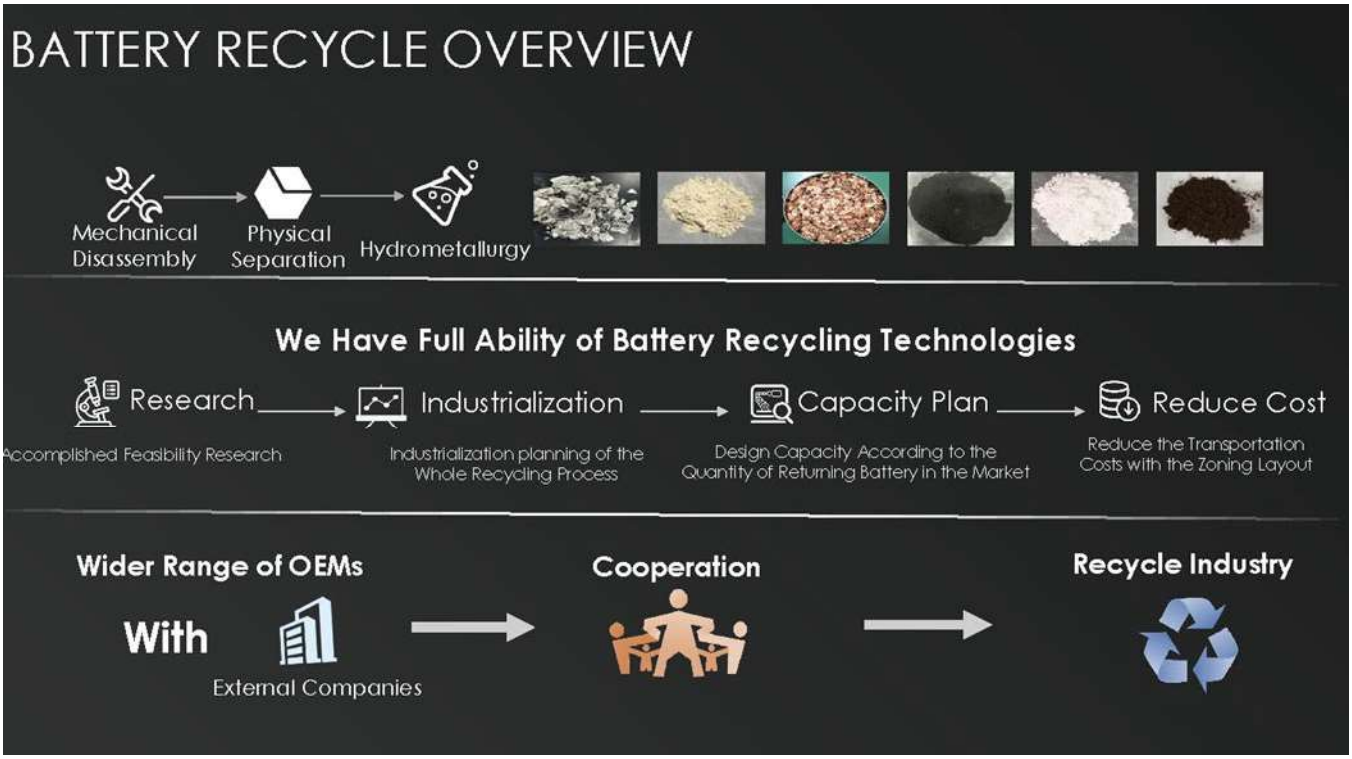
BATTERY END-OF-LIFE

BATTERY END-OF-LIFE

BYD's LFP batteries have the added value of providing each of our customers a full second useful life after the Bus's 12-year End-of-Life (EOL) full transit duty cycle. Unlike other battery chemistries that have a simple "**Cradle-to-Grave**" battery disposal, where at the EOL the battery chemistry can only be recycled, BYD is in a unique position, because of our vertical integration, to re-purpose batteries from our transit buses (once they reach their useful life cycle) into our own Energy Storage Systems. We are our customer for re-purposing, recycling, and re-certifying packs and modules for use in additional applications.

BYD's batteries can be re-purposed and used in a full Utility-Grade Energy Storage System. This second-life of the batteries in a Utility-Grade ESS can provide a complete power solution realizing power output smoothing, peaking shaving, frequency regulation, transient active power responding, and transient voltage supporting to keep the power system running safely, sustainability, and reliably.





ACKNOWLEDGE OF ADDENDA

CER 3. Acknowledgement of Addenda

Failure to acknowledge receipt of all addenda may cause the Proposal to be considered nonresponsive to the Solicitation. Acknowledged receipt of each addendum must be clearly established and included with the Proposal.

The undersigned acknowledges receipt of the following addenda to the documents:

Addendum No.: 1	Dated: 7/29/21	Addendum No.: 5	Dated: 9/1/21
Addendum No.: 2	Dated: 8/5/21	Addendum No.: 6	Dated: 9/10/21
Addendum No.: 3	Dated: 8/17/21	Addendum No.: 7	Dated: 9/15/21
Addendum No.: 4	Dated: 8/30/21	Addendum No.: 8	Dated: 9/20/21

Proposer: BYD Coach and Bus LLC
Name: Patrick Duan
Title: Senior Vice President of Operations
Phone: (213) 748-3980
Street address: 1800 S. Figueroa St.
City, state, ZIP: Los Angeles, CA 90015

Authorized signature

9/21/21

Date

CONTRACTOR SERVICE AND PARTS SUPPORT DATA

CER 4. Contractor Service and Parts Support Data

Location of nearest Technical Service Representative to Agency

Name: East Coast Service Center
Address: 33 Gregg Street Lodi, NJ 07644
Telephone: (201) 843-3052
Describe technical services readily available from said representative:

Service Provided: Customer Support/Troubleshooting, Warranty, Parts, Prevantive Maintenance

Location of nearest Parts Distribution Center to Agency:

Name: East Coast Service Center
Address: 33 Gregg Street Lodi, NJ 07644
Telephone: (201) 843-3980
Describe the extent of parts available at said center:

All parts for local east coast model buses.

Policy for delivery of parts and components to be purchased for service and maintenance:

Regular method of shipment:
Cost to Agency:

Cost to Agency:
1. Customer no need to bear any cost if the parts still under warranty.
2. Customer should bear the freight if customer want to purchase parts, it is subject to actual freight. Frieght will be listed in the invoice as a separate item.

FORM OF PROPOSAL DEVIATION

CER 5. Form for Proposal Deviation

This form shall be completed for each condition, exception, reservation or understanding (i.e., Deviation) in the Proposal according to "Conditions, Exceptions, Reservations or Understandings." One copy without any price/cost information is to be placed in the Technical Proposal as specified in "Technical Proposal Requirements," and a separate copy with any price/cost information placed in the Price Proposal as specified in "Price Proposal Requirements."

PSTA
[RFP 21-980369]

Deviation No.: 1	**Contractor:** BYD	**RFP section:** TS 19 Altoona Testing	**Page:** 99
Complete description of Deviation: The BYD K9MD will complete the Altoona test on Q2 of 2022			
Rationale (pros and cons): This will ensure that the bus delivered will be Altoona Tested and required by the RFP.			

CER 5. Form for Proposal Deviation

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PSTA
[RFP 21-980369]

Deviation No.: 2	**Contractor:** BYD	**RFP section:** TS 19 Altoona Testing	**Page:** 99
Complete description of Deviation: The BYD C10M model will complete the Altoona test on Q4 of 2022			
Rationale (pros and cons): This will ensure that the bus delivered will be Altoona Tested and required by the RFP.			

VEHICLE QUESTIONNAIRE

CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K7M 30FT

CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

GENERGAL COACH DATA SHEET	
Bus manufacturer:	BYD Coach&Bus LLC
Bus model:	K7M-ER
Understructure manufacturer:	BYD
Model number:	NA
Size/Type of Bus	30ft
Basic Body Construction	
Type:	Semi-monocoque body
Tubing or frame member thickness and dimensions	
Overstructure	Aluminum tube from 1.57” × 2” × 0.12” to 11.09” × 2” × 0.12”
Understructure	Steel tube from 1.18” × 1.18” × 0.06” to 6.3” × 2.36” × 0.24”
Skin thickness and material	
Roof	0.06 in. Aluminum
Sidewall	0.08 in. Aluminum
Skirt panel	0.08 in. Aluminum
Front end	0.12 in. Fiberglass
Rear end	0.12 in. Fiberglass
Dimensions	

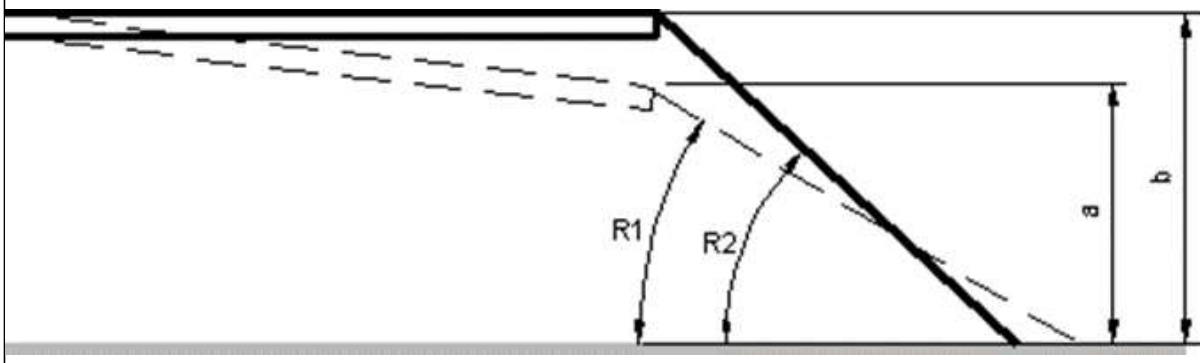
Overall length	Over bumpers	29	ft	10.8	in
	Over Body	29	ft	3	in
Overall width	Over body excluding mirrors	8	ft	6	in
	Over body including mirrors-driving position	10	ft	0	in
	Over tires front axles	6	ft	11	in
	Over tires center axle	NA	ft	NA	in
	Over tires rear axles	6	ft	3	In
Overall height (maximum)		11	ft	2	in
Overall height (main roof line)		9	ft	7	in

Angle of approach	≥8.6	deg	
Breakover angle	≥8	deg	
Breakover angle (rear)	NA	deg	
Angle of departure	≥8.6	deg	

Doorway Dimensions	**Front**		**Rear**	
Width between door posts	Bottom 45.2 Top 39.1	in.	41.3	in.

Door width between panels	36.9	in.	36.3	in.
Clear door width	34.8	in.	33.3	in.
Doorway height	79	in.	77.3	in.
Knuckle clearance	＞0.8	in.	＞0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	12.5	in.	R1	10	deg	a.	12.2	in.
Unkneeled	b.	15.2	in.	R2	12.2	deg	b.	15	in.

Interior head room (center of aisle)		
Front axle location	96	in.
Center axle location	NA	in.
Rear axle location	74	in.

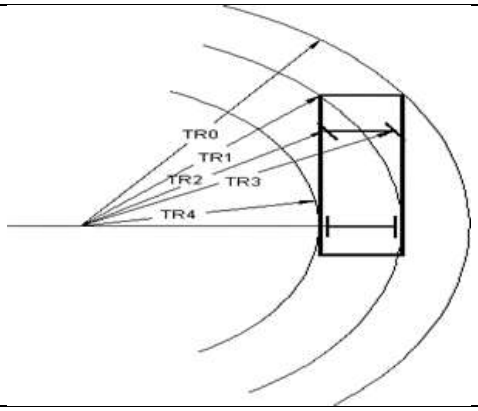
Aisle width between transverse seats	≥22	in.

Floor height above ground (centerline of bus)		
At front door	15.2	in.
At front axle	16.1	in.
At drive axle	33.6	in.
At rear door	15	in.

Minimum ground clearance (between bus and ground, with bus unkneeled)		
Excluding axles	10.1	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)				
Outside body turning radius, TR0 (including bumper)	30	ft	10.8	in.
Front inner corner radius, TR1	25	ft	9.6	in.
Front wheel inner turning radius, TR2	20	ft	1	in.
Front wheel outer turning radius, TR3	25	ft	8	in.

Inside Body Turning Radius innermost point, TR4 (including bumper)	12	ft	9.5	in.



Wheelbase

Front	174.8	in.
Rear	NA	in.

Overhang, centerline of axle over bumper

Front	87	in.
Rear	97.4	in.

Floor

Interior length	26	ft.	1.5	in.
Interior width (excluding coving)	7	ft.	6.7	in.
Total standee area (approximately)	30	sq ft.		
Minimum distance between wheelhouses:	Front		35.5	in.
	Rear		23.5	in.
	Center		NA	in.
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	20	
Standee capacity	20	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	**Front axle**			**Center axle**			**Rear axle**			**Total bus**
		Left	Right	Total	Left	Right	Total	Left	Right	Total	
Empty bus, full fuel	0	5398	5230	10629	NA	NA	NA	9170	8851	18021	28650

and farebox											
Fully seated, full fuel and farebox	20+1	5568	5276	10843	NA	NA	NA	10092	9514	19607	30450
Fully loaded standee and fully seated, full fuel and farebox	40+1	6591	6276	12866	NA	NA	NA	10845	11089	21934	34800
Crush load (1.5x fully loaded)	60+1	7159	6817	13975	NA	NA	NA	11780	12045	23825	37800
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	37479
GAWR	NA	NA	NA	15653	NA	NA	NA	NA	NA	27778	43431

Energy Storage	
Batteries – low voltage	
Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps
Batteries – high voltage	
Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	295
Standard Charge Time	2-2.5
Charging Capacity	150kW
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD
Performance	
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	BYD
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	LFP
Max Gradeability	K01/K02

Top Speed	295
Battery Range	2-2.5
Acceleration (20 MPH)	150kW
Acceleration (40 MPH)	10 °F to 115 °F
Top Speed (stated above)	BYD

Performance information/graphs to be attached with this form:

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

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 10000rpm		
Traction motor horsepower rating		550Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	17.7	Reverse:	17.7
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13B		
Quantity		2		
Torque Rating		400Nm*2		

kWh Rating	110kW*2	
Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	15653	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13B	
Gross Axle weight rating	27778	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Gross Axle weight rating	NA	lb.
Axle load	NA	lb.
Suspension system		
Manufacturer	ZF	

Type	First	Air
	Second	Air
	Third	NA
Springs	First	2
	Second	4
	Third	NA
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	8050 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Michelin	
Type	Radial	
Size	305/70R 22.5	
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Bosch 8098 957 124	
Type	Ball-Nut Type	
Ratio	22.2	
Power steering fluid capacity	2.11	gal

Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter	18	in.

Brakes

Make and fundamental brake system	Knorr	
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7
	Second:	24 in Disc Brakes SB7
	Third:	NA
Brake operation effort	NA	

Slake adjuster's vendors' type and part numbers

First:	Right:	NA
	Left:	NA
Second:	Right:	NA
	Left:	NA
Third:	Right:	NA
	Left:	NA
Length:	First take-up:	NA
	Second take-up:	NA
	Third take-up:	NA

Brake_____Drums__X___Discs_____ (Placing X denoting type)

First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	NA	
	Part number	NA	
	Diameter	NA	in.

Brake lining/pad manufacturer	Knorr
Type	T7400

Brake lining/pad identification

First:	Forward	NA
	Reverse	NA
Second:	Forward	NA
	Reverse	NA
Third:	Forward	NA
	Reverse	NA
Brake linings per shoe		
First	2	
Second	2	
Third	NA	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	NA	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	NA	in.
Brake lining thickness/pad		in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	NA	sq. in.
Cooling System		
Radiator		
Manufacturer	Modine	
Type	Liquid Cooling	
Model number	PR0456580001	
Number of tubes	72	
Tubes outer diameter	0.74×0.05 in.	in.
Fins per inch	18	fins

Fin thickness	0.0039		in.	
Total cooling and heating system capacity	5		gal	
Radiator fan speed control				
Surge tank capacity	2.28		qt	
Thermostat temperature setting:	Initial opening (fully closed)		104	°F
	Fully open		125.6	°F
Overheat alarm temperature sending unit setting	149		°F	
Shutdown temperature setting	185		°F	

Air reservoir capacity			
Supply reservoir	NA	cu in.	
Primary reservoir	1831	cu in.	
Secondary reservoir	1831	cu in.	
Packing reservoir	1831	cu in.	
Accessory reservoir	5493	cu in.	
Other reservoir type	1831	cu in.	

Heating, ventilation and air conditioning equipment			
Heating system capacity	68243	BTU/hr.	
Air conditioning capacity	81891	BTU	
Ventilating capacity	589	CFM	

Compressor				
Manufacturer		Panasonic		
Model		C650		
Number of cylinders		1		
Drive ratio		NA		
Maximum warranted speed		NA	rpm	
Operating speed		Variable	rpm (recommended)	
Weight		51.8	lb.	
Oil capacity	Dry	0.5	gal	
	Wet	NA	gal	
Refrigerant:	Type	R410a	14.3	**lb.**

Condenser

Manufacturer	NA	
Model	NA	
Number of fins/in.	NA	
Outer diameter of tube	0.08	in.
Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.

Fin thickness	0.004	in.
Number of evaporators	NA	
Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		

Make	BYD		
Model	NA		
Capacity	34130	Btu	
Interior lighting			
Manufacturer	I/O Controls		
Type	NICHIA 757 8 LED PCB		
Number of fixtures	12		
Size of fixtures	72''		
Power pack	IOC-8001-803		
Doors			
Front			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Rear			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Passenger windows			
Front			
Manufacturer	Ricon		
Model	NA		
Type	Hidden Frame		
Number:	Side	7+1(driver side)	
	Rear	NA	
Sizes: 59.4" x 35.7" (Driver's)	47.5" x 40.9" / 58.6" x 40.9" (L)	44.3" x 40.9" / 58.3" x 40.9" (L)	
45.4" x 40.9" / 39.6" x 40.9" (R)	44.3" x 40.9" / 58.3" x 40.9" (R)		
Glazing:	Type	Tempered	
	Thickness	3/16''	
	Color of tint	Grey	
	Light transmission	≥50%	

Mirrors

	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	6.85'' x 14.7''	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA
Left side exterior	6.85'' x 14.7''	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA
Center rearview	8'' x 16''	Flat	Safefleet	A1706-1	NA
Front entrance area	6''	Round, Convex	Safefleet	A1712	NA
Upper-right corner	6''	Round, Convex	Safefleet	A1712	NA
Rear exit area	12''	Round, Convex	Safefleet	A6011-1	NA

Seats

Passenger

Manufacturer	FREEDMAN
Model	4-ONE GEMINI
Type	Cantilever

Operator

Manufacturer	Recaro
Model and part number	800.00.7R1.CC11
Type	Air Control

Paint

Manufacturer	Axalta / PPG
Type	Fast drying, oil based

Wheelchair ramp equipment

Manufacturer	Ricon	
Model number	SSR-0M27291Y00	
Capacity	1000	lb.
Width of platform	30	in.
Length of platform	51.4	in.
System fluid capacity	NA	qt

Type of fluid used	NA	
Operating hydraulic pressure	NA	psi
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4-point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.
Electrical		

Multiplex System				
Manufacturer		I/O Controls		
Model number		G4		
Batteries				
Manufacturer		Odyssey		
Model number		31-PC2150		
Type		AGM		
Communication System				
GPS				
Manufacturer		I/O Controls		
Model number		IO VDL G4		
PA system				
	Manufacturer	**Model number**	**Number**	
Amplifier	REI	REI-700890	1	Amplifier
Microphone	REI	REI-480054BK	1	Microphone
Internal speakers	REI	220010	8	Internal speakers
External speaker	REI	230049	1	External speaker
Energy Storage				
Type		LFP		
Number of cells		3.2	V	
Battery pack voltage		672	V	
Weight		4,630	lb.	
Security camera system				
Manufacturer		Luminator(or Customer preference)		
Model number		RR-HDRK12-4000		
Number of cameras		10		
Storage capacity		10TB		
Bike racks				
Manufacturer		SportWorks(or Customer preference)		
Model number		2 position		

Fire Detection System			
Manufacturer		Amerex	
Model number		V25 / VH25 ABC	
Fire detectors		Yes	
Type (thermal or optical)		Thermal	
Number of detectors		8	
Automatic voice annunciator system			
Manufacturer		Clever Device – Or Customer Preference	
Model and part number		IVN 3TN/301-221-1029	
Annunciator LED sign			
Number of signs		2	
Housing dimensions		33.24*4 in	
Character length		33	in.
Character height		4	in.
Character width		2.16	in.
GPS antenna			
Manufacturer		Clever Device – Or Customer Preference	
Model and part number		2467	
Automatic passenger counter			
Manufacturer		Clever Device- Or Customer Preference	
Model and part number	a.	118-300-0110PL	
	b.	118-300-0101PL	
	c.	118-300-0102PL	
Sensor type		Reflective Infrared Sensor	
Real-time bus arrival prediction system			
	Manufacturer	**Model number**	
Router	Optional-Customer Preference		
Cellular modem	Optional-Customer Preference		
Charge protection	Optional-Customer Preference		

NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.

CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K8M 35FT

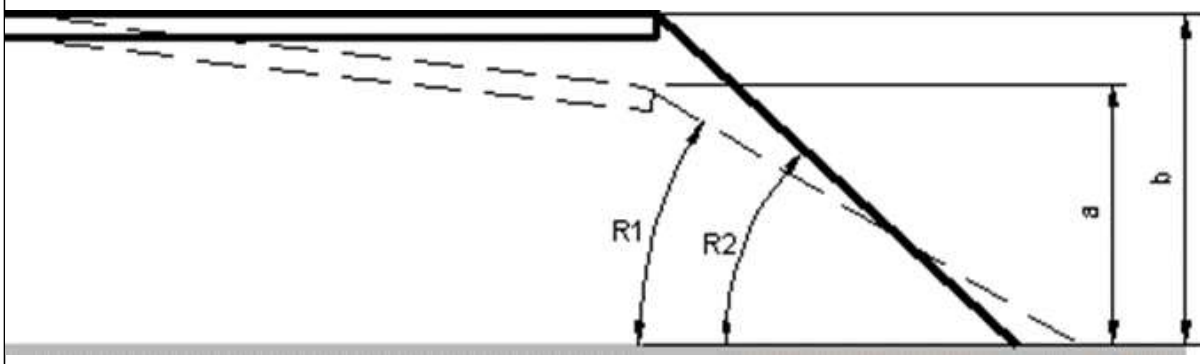
CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

GENERGAL COACH DATA SHEET						
Bus manufacturer:	BYD Coach&Bus LLC					
Bus model:	K8M					
Understructure manufacturer:	BYD					
Model number:	NA					
Size/Type of Bus	35ft					
Basic Body Construction						
Type:	Semi-monocoque body					
Tubing or frame member thickness and dimensions						
Overstructure	Aluminum tube from 1.57” × 2” × 0.12” to 11.09” × 2” × 0.12”					
Understructure	Steel tube from 1.18” × 1.18” × 0.06” to 6.3” × 2.36” × 0.24”					
Skin thickness and material						
Roof	0.06 in. Aluminum					
Sidewall	0.08 in. Aluminum					
Skirt panel	0.08 in. Aluminum					
Front end	0.12 in. Fiberglass					
Rear end	0.12 in. Fiberglass					
Dimensions						
Overall length	Over bumpers	35	ft	9.6	in	
	Over Body	35	ft	2.9	in	
Overall width	Over body excluding mirrors	8	ft	6	in	
	Over body including mirrors-driving position	10	ft	0	in	
	Over tires front axles	6	ft	11	in	
	Over tires center axle	NA	ft	NA	in	
	Over tires rear axles	6	ft	3	In	
Overall height (maximum)		11	ft	2	in	
Overall height (main roof line)		9	ft	7	in	
Angle of approach	≥8.6	deg				
Breakover angle	≥8	deg				
Breakover angle (rear)	NA	deg				
Angle of departure	≥8.6	deg				
Doorway Dimensions	**Front**		**Rear**			

Width between door posts	Bottom 45.2 Top 39.1	in.	41.3	in.
Door width between panels	36.9	in.	36.3	in.
Clear door width	34.8	in.	33.3	in.
Doorway height	79	in.	78.5	in.
Knuckle clearance	＞0.8	in.	＞0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	12.5	in.	R1	10	deg	a.	12.2	in.
Unkneeled	b.	15.2	in.	R2	12.2	deg	b.	15	in.

Interior head room (center of aisle)		
Front axle location	96	in.
Center axle location	NA	in.
Rear axle location	74	in.
Aisle width between transverse seats	≥22	in.

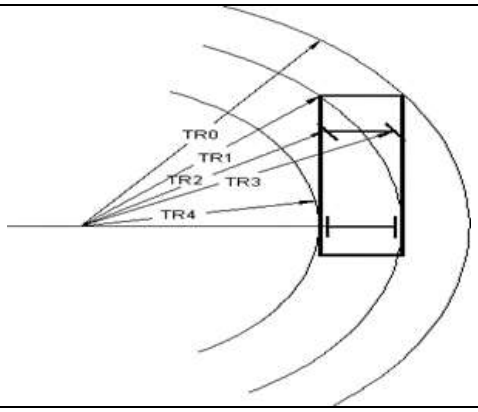
Floor height above ground (centerline of bus)		
At front door	15.2	in.
At front axle	16.1	in.
At drive axle	33.6	in.
At rear door	15	in.

Minimum ground clearance (between bus and ground, with bus unkneeled)		
Excluding axles	10.1	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper)	35	ft	4.8	in.

Front inner corner radius, TR1	29	ft	10.8	in.
Front wheel inner turning radius, TR2	24	ft	4.8	in.
Front wheel outer turning radius, TR3	30	ft	0	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	12	ft	2.4	in.



Wheelbase

Front	222.7	in.
Rear	NA	in.

Overhang, centerline of axle over bumper

Front	87	in.
Rear	120	in.

Floor

Interior length	30	ft.	0	in.
Interior width (excluding coving)	7	ft.	6	in.
Total standee area (approximately)	42	sq ft.		
Minimum distance between wheelhouses:	Front		35.5	in.
	Rear		23.5	in.
	Center		NA	in.
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	32	
Standee capacity	28	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox	0	5502	5477	10979	NA	NA	NA	10592	10539	21141	32120
Fully seated, full fuel and farebox	32+1	6084	5909	11993	NA	NA	NA	12733	12344	25077	37070
Fully loaded standee and fully seated, full fuel and farebox	60+1	7142	6962	14108	NA	NA	NA	13780	13382	27162	41270
Crush load (1.5x fully loaded)	90+1	7921	7721	15646	NA	NA	NA	15283	14841	30124	45770
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	41888
GAWR	NA	NA	NA	15653	NA	NA	NA	NA	NA	27778	43431

Energy Storage

Batteries – low voltage	
Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps

Batteries – high voltage	
Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	435
Standard Charge Time	3-3.5
Charging Capacity	150kW
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD

Performance

Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	2kwh/mile
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	15.35
Max Gradeability	≥18
Top Speed	65
Battery Range	196
Acceleration (20 MPH)	≤10
Acceleration (40 MPH)	≤30
Top Speed (stated above)	≤60

Performance information/graphs to be attached with this form:

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

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 10000rpm		
Traction motor horsepower rating		550Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	17.7	Reverse:	17.7
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		

Type	Permanent Magnet Synchronous Motor/3 Phase	
Model	BYDEQ13B	
Quantity	2	
Torque Rating	400Nm*2	
kWh Rating	110kW*2	
Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	15653	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13B	
Gross Axle weight rating	27778	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Gross Axle weight rating	NA	lb.

Axle load	NA	lb.
Suspension system		
Manufacturer	ZF	
Type	First	Air
	Second	Air
	Third	NA
Springs	First	2
	Second	4
	Third	NA
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	8050 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Michelin	
Type	Radial	
Size	305/70R 22.5	
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Bosch 8098 957 124	
Type	Ball-Nut Type	

Ratio	22.2	
Power steering fluid capacity	2.11	gal
Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter	18	in.

Brakes

Make and fundamental brake system	Knorr	
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7
	Second:	24 in Disc Brakes SB7
	Third:	NA
Brake operation effort	NA	

Slake adjuster's vendors' type and part numbers

First:	Right:	NA
	Left:	NA
Second:	Right:	NA
	Left:	NA
Third:	Right:	NA
	Left:	NA
Length:	First take-up:	NA
	Second take-up:	NA
	Third take-up:	NA

Brake_____Drums__X___Discs_____ (Placing X denoting type)

First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	NA	
	Part number	NA	
	Diameter	NA	in.

Brake lining/pad manufacturer	Knorr

Type	T7400	
Brake lining/pad identification		
First:	Forward	NA
	Reverse	NA
Second:	Forward	NA
	Reverse	NA
Third:	Forward	NA
	Reverse	NA
Brake linings per shoe		
First	2	
Second	2	
Third	NA	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	NA	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	NA	in.
Brake lining thickness/pad	0.827	in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	NA	sq. in.
Cooling System		
Radiator		
Manufacturer	Modine	
Type	Liquid Cooling	
Model number	PR0456580001	

Number of tubes	72			
Tubes outer diameter	0.74×0.05	in.		in.
Fins per inch	18		fins	
Fin thickness	0.0039		in.	
Total cooling and heating system capacity	5		gal	
Radiator fan speed control	1200 – 4750 rpm			
Surge tank capacity	2.28		qt	
Thermostat temperature setting:	Initial opening (fully closed)		104	°F
	Fully open		125.6	°F
Overheat alarm temperature sending unit setting	149		°F	
Shutdown temperature setting	185		°F	

Air reservoir capacity			
Supply reservoir		NA	cu in.
Primary reservoir		1831	cu in.
Secondary reservoir		1831	cu in.
Packing reservoir		1831	cu in.
Accessory reservoir		5493	cu in.
Other reservoir type		1831	cu in.
Heating, ventilation and air conditioning equipment			
Heating system capacity		68243	BTU/hr.
Air conditioning capacity		81891	BTU
Ventilating capacity		589	CFM
Compressor			
Manufacturer		Panasonic	
Model		C650	
Number of cylinders		1	
Drive ratio		NA	
Maximum warranted speed		NA	rpm
Operating speed		Variable	rpm (recommended)
Weight		51.8	lb.
Oil capacity	Dry	0.5	gal
	Wet	NA	gal

Refrigerant:	Type	R410a	14.3	**lb.**
Condenser				
Manufacturer		NA		
Model		NA		
Number of fins/in.		NA		
Outer diameter of tube		0.08	in.	
Fin thickness		NA	in.	
Condenser Fan				
Manufacturer		SPAL		
Model		VA89		
Fan diameter		12	in.	
Speed maximum		3400	rpm	
Flow rate (maximum)		NA	CFM	
Receiver				
Manufacturer		NA		
Model				
Capacity				
Condenser fan drive motors				
Manufacturer	SPAL			
Model	NA			
Type	Brushless			
Horsepower	0.27	hp		
Operating speed	2600	rpm		
Evaporator fan drive motors				
Manufacturer	NA			
Model	NA			
Type	NA			
Horsepower	0.74	hp		
Operating speed	1400	rpm		
Evaporator(s)				
Manufacturer	BYD			
Model	NA			

Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.
Fin thickness	0.004	in.
Number of evaporators	NA	
Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		

Type	Centrifugal		
Coolant Heater			
Make	BYD		
Model	NA		
Capacity	34130	Btu	
Interior lighting			
Manufacturer	I/O Controls		
Type	NICHIA 757 8 LED PCB		
Number of fixtures	12		
Size of fixtures	72''		
Power pack	IOC-8001-803		
Doors			
Front			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Rear			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Passenger windows			
Front			
Manufacturer	Ricon		
Model	NA		
Type	Hidden Frame		
Number:	Side	8+1(driver side)	
	Rear	NA	
Sizes: 57.8" x 45.2" / 60.2" x 45.2" (L)	47.8" x 45.2" / 60.0" x 45.2" (L)	60.0" x 45.2" / 60.0" x 45.2" (L)	
54.0" x 45.2" / 57.8" x 45.2" (R)	37.4" x 45.2" / 45.9" x 45.2" (R)	60.0" x 45.2" / 60.0" x 45.2" (R)	
Glazing:	Type	Tempered	

	Thickness	3/16''
	Color of tint	Grey
	Light transmission	≥50%

Mirrors

	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	6.85'' x 14.7''	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA
Left side exterior	6.85'' x 14.7''	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA
Center rearview	8'' x 16''	Flat	Safefleet	A1706-1	NA
Front entrance area	6''	Round, Convex	Safefleet	A1712	NA
Upper-right corner	6''	Round, Convex	Safefleet	A1712	NA
Rear exit area	12''	Round, Convex	Safefleet	A6011-1	NA

Seats

Passenger

Manufacturer	FREEDMAN
Model	4-ONE GEMINI
Type	Cantilever

Operator

Manufacturer	Recaro
Model and part number	800.00.7R1.CC11
Type	Air Control

Paint

Manufacturer	Axalta / PPG
Type	Fast drying, oil based

Wheelchair ramp equipment

Manufacturer	Ricon	
Model number	SSR-0M27291Y00	
Capacity	1000	lb.

Width of platform	30	in.
Length of platform	51.4	in.
System fluid capacity	NA	qt
Type of fluid used	NA	
Operating hydraulic pressure	NA	psi
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4-point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.

Electrical

Multiplex System

Manufacturer	I/O Controls
Model number	G4

Batteries

Manufacturer	Odyssey
Model number	31-PC2150
Type	AGM

Communication System

GPS

Manufacturer	I/O Controls
Model number	IO VDL G4

PA system

	Manufacturer	Model number	Number	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	

Energy Storage

Type	LFP	
Number of cells	3.2	V
Battery pack voltage	640	V
Weight	6,835	lb.

Security camera system

Manufacturer	Luminator(or Customer preference)
Model number	RR-HDRK12-4000
Number of cameras	10
Storage capacity	10TB

Bike racks

Manufacturer	SportWorks(or Customer preference)	
Model number	2 position	
Fire Detection System		
Manufacturer	Amerex	
Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	8	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number a.	118-300-0110PL	
b.	118-300-0101PL	
c.	118-300-0102PL	
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	**Model number**

Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.

CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K9M 40FT

CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

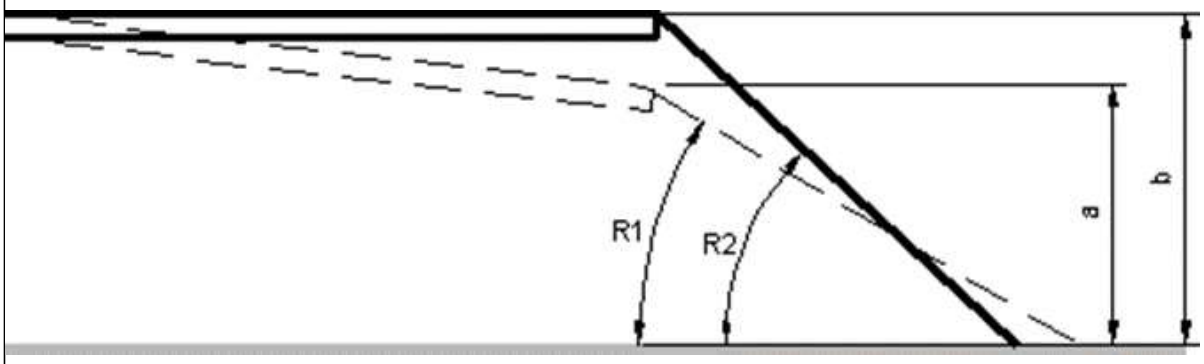
GENERGAL COACH DATA SHEET						
Bus manufacturer:	BYD Coach&Bus LLC					
Bus model:	K9M					
Understructure manufacturer:	BYD					
Model number:	NA					
Size/Type of Bus	40ft					
Basic Body Construction						
Type:	Semi-monocoque body					
Tubing or frame member thickness and dimensions						
Overstructure	Aluminum tube from 1.57” × 2” × 0.12” to 11.09” × 2” × 0.12”					
Understructure	Steel tube from 1.18” × 1.18” × 0.06” to 6.3” × 2.36” × 0.24”					
Skin thickness and material						
Roof	0.06 in. Aluminum					
Sidewall	0.08 in. Aluminum					
Skirt panel	0.08 in. Aluminum					
Front end	0.12 in. Fiberglass					
Rear end	0.12 in. Fiberglass					
Dimensions						
Overall length	Over bumpers	40	ft	2.4	in	
	Over Body	39	ft	7.1	in	
Overall width	Over body excluding mirrors	8	ft	6	in	
	Over body including mirrors-driving position	10	ft	0	in	
	Over tires front axles	6	ft	11	in	
	Over tires center axle	NA	ft	NA	in	
	Over tires rear axles	6	ft	3	In	
Overall height (maximum)		11	ft	2	in	
Overall height (main roof line)		9	ft	7	in	

Angle of approach	≥8.6	deg	
Breakover angle	≥8	deg	
Breakover angle (rear)	NA	deg	
Angle of departure	≥8.6	deg	

Doorway Dimensions	**Front**		**Rear**	

Width between door posts	Bottom 48.3 Top 43.5	in.	42.3	in.
Door width between panels	42.8	in.	38.3	in.
Clear door width	34.8	in.	36	in.
Doorway height	76	in.	77.5	in.
Knuckle clearance	＞0.8	in.	＞0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	13	in.	R1	10.4	deg	a.	15.8	in.
Unkneeled	b.	14.4	in.	R2	12.4	deg	b.	15.8	in.

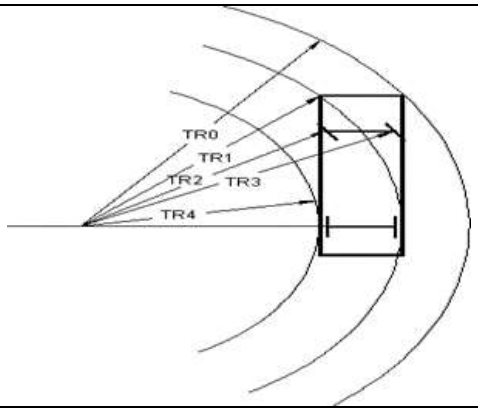
Interior head room (center of aisle)		
Front axle location	96	in.
Center axle location	NA	in.
Rear axle location	74	in.
Aisle width between transverse seats	≥22	in.

Floor height above ground (centerline of bus)		
At front door	15.4	in.
At front axle	16.1	in.
At drive axle	37	in.
At rear door	15.8	in.

Minimum ground clearance (between bus and ground, with bus unkneeled)		
Excluding axles	10.1	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)				
Outside body turning radius, TR0 (including bumper)	41	ft	8.4	in.

Front inner corner radius, TR1	35	ft	9.6	in.
Front wheel inner turning radius, TR2	29	ft	9.6	in.
Front wheel outer turning radius, TR3	35	ft	3.6	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	21	ft	0	in.



Wheelbase

Front	246.1	in.
Rear	NA	in.

Overhang, centerline of axle over bumper

Front	102.4	in.
Rear	134.49	in.

Floor

Interior length	35	ft.	10.6	in.
Interior width (excluding coving)	7	ft.	11	in.
Total standee area (approximately)	46.6	sq ft.		
Minimum distance between wheelhouses:	Front		35.5	in.
	Rear		23.5	in.
	Center		NA	in.
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	37	
Standee capacity	29	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox	0	5591	5642	11233	NA	NA	NA	10429	10528	20957	32190
Fully seated, full fuel and farebox	37+1	6356	6257	12613	NA	NA	NA	12744	12533	25277	37890
Fully loaded standee and fully seated, full fuel and farebox	66+1	7494	7401	14905	NA	NA	NA	14015	13320	27335	42240
Crush load (1.5x fully loaded)	99+1	8372	8268	16652	NA	NA	NA	15657	14881	30538	47190
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	43431
GAWR	NA	NA	NA	15653	NA	NA	NA	NA	NA	27778	43431

Energy Storage	
Batteries – low voltage	
Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps
Batteries – high voltage	
Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	348
Standard Charge Time	2-2.5
Charging Capacity	150kW
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD
Performance	
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	2.0kWh/mil
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	16.85
Max Gradeability	≥17
Top Speed	65
Battery Range	157

Acceleration (20 MPH)	<=10
Acceleration (40 MPH)	<=30
Top Speed (stated above)	65mph

Performance information/graphs to be attached with this form:

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

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 10000rpm		
Traction motor horsepower rating		550Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	17.7	Reverse:	17.7
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13B		
Quantity		2		
Torque Rating		400Nm*2		
kWh Rating		110kW*2		

Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi

Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	15653	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13B	
Gross Axle weight rating	27778	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Gross Axle weight rating	NA	lb.
Axle load	NA	lb.
Suspension system		
Manufacturer	ZF	
Type	First	Air
	Second	Air

	Third	NA
Springs	First	2
	Second	4
	Third	NA
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	8050 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Michelin	
Type	Radial	
Size	305/70R 22.5	
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Bosch 8098 957 124	
Type	Ball-Nut Type	
Ratio	22.2	
Power steering fluid capacity	2.11	gal
Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter	18	in.

Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in Disc Brakes SB7	
	Third:	NA	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake_____Drums__X___Discs_____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	NA	
	Part number	NA	
	Diameter	NA	in.
Brake lining/pad manufacturer	Knorr		
Type	T7400		
Brake lining/pad identification			
First:	Forward	NA	
	Reverse	NA	
Second:	Forward	NA	

	Reverse	NA
Third:	Forward	NA
	Reverse	NA
Brake linings per shoe		
First	2	
Second	2	
Third	NA	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	NA	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	NA	in.
Brake lining thickness/pad	0.827	in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	NA	sq. in.

Cooling System				
Radiator				
Manufacturer	Modine			
Type	Liquid Cooling			
Model number	PR0456580001			
Number of tubes	72			
Tubes outer diameter	0.74×0.05	in.		in.
Fins per inch	18		fins	
Fin thickness	0.0039		in.	
Total cooling and heating system capacity	5		gal	
Radiator fan speed control	1200 – 4750 rpm			

Surge tank capacity	2.28	qt	
Thermostat temperature setting:	Initial opening (fully closed)	104	°F
	Fully open	125.6	°F
Overheat alarm temperature sending unit setting	149	°F	
Shutdown temperature setting	185	°F	

Air reservoir capacity

Supply reservoir	NA	cu in.
Primary reservoir	1831	cu in.
Secondary reservoir	1831	cu in.
Packing reservoir	1831	cu in.
Accessory reservoir	5493	cu in.
Other reservoir type	1831	cu in.

Heating, ventilation and air conditioning equipment

Heating system capacity	68243	BTU/hr.
Air conditioning capacity	81891	BTU
Ventilating capacity	589	CFM

Compressor

Manufacturer		Panasonic		
Model		C650		
Number of cylinders		1		
Drive ratio		NA		
Maximum warranted speed		NA	rpm	
Operating speed		Variable	rpm (recommended)	
Weight		51.8	lb.	
Oil capacity	Dry	0.5	gal	
	Wet	NA	gal	
Refrigerant:	Type	R410a	14.3	**lb.**

Condenser

Manufacturer	NA
Model	NA
Number of fins/in.	NA

Outer diameter of tube	0.08	in.
Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.
Fin thickness	0.004	in.
Number of evaporators	NA	

Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		
Make	BYD	
Model	NA	
Capacity	34130	Btu

Interior lighting			
Manufacturer	I/O Controls		
Type	NICHIA 757 8 LED PCB		
Number of fixtures	12		
Size of fixtures	72''		
Power pack	IOC-8001-803		
Doors			
Front			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Rear			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Passenger windows			
Front			
Manufacturer	Ricon		
Model	NA		
Type	Hidden Frame		
Number:	Side	7+1(driver side)	
	Rear	NA	
Sizes: 59.4" x 35.7" (Driver's)	47.5" x 40.9" / 58.6" x 40.9" (L)	44.3" x 40.9" / 58.3" x 40.9" (L)	
45.4" x 40.9" / 39.6" x 40.9" (R)	44.3" x 40.9" / 58.3" x 40.9" (R)		
Glazing:	Type	Tempered	
	Thickness	3/16''	
	Color of tint	Grey	
	Light transmission	≥50%	
Mirrors			

	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	6.85'' x 14.7''	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA
Left side exterior	6.85'' x 14.7''	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA
Center rearview	8'' x 16''	Flat	Safefleet	A1706-1	NA
Front entrance area	6''	Round, Convex	Safefleet	A1712	NA
Upper-right corner	6''	Round, Convex	Safefleet	A1712	NA
Rear exit area	12''	Round, Convex	Safefleet	A6011-1	NA

Seats

Passenger	
Manufacturer	FREEDMAN
Model	4-ONE GEMINI
Type	Cantilever

Operator	
Manufacturer	Recaro
Model and part number	800.00.7R1.CC11
Type	Air Control

Paint

Manufacturer	Axalta / PPG
Type	Fast drying, oil based

Wheelchair ramp equipment

Manufacturer	Ricon	
Model number	SSR-0M27291Y00	
Capacity	1000	lb.
Width of platform	30	in.
Length of platform	51.4	in.
System fluid capacity	NA	qt
Type of fluid used	NA	
Operating hydraulic pressure	NA	psi

Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4-point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.
Electrical		
Multiplex System		
Manufacturer	I/O Controls	
Model number	G4	

Batteries				
Manufacturer	Odyssey			
Model number	31-PC2150			
Type	AGM			
Communication System				
GPS				
Manufacturer	I/O Controls			
Model number	IO VDL G4			
PA system				
	Manufacturer	**Model number**	**Number**	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	
Energy Storage				
Type	LFP			
Number of cells	3.2	V		
Battery pack voltage	512	V		
Weight	5,467	lb.		
Security camera system				
Manufacturer	Luminator(or Customer preference)			
Model number	RR-HDRK12-4000			
Number of cameras	10			
Storage capacity	10TB			
Bike racks				
Manufacturer	SportWorks(or Customer preference)			
Model number	2 position			
Fire Detection System				
Manufacturer	Amerex			

Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	8	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number a.	118-300-0110PL	
b.	118-300-0101PL	
c.	118-300-0102PL	
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	**Model number**
Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.

CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K9MD 40FT

CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

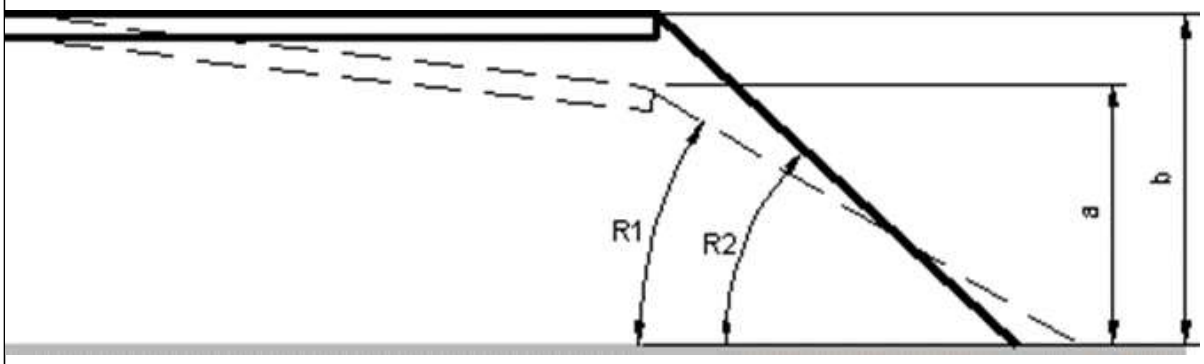
GENERGAL COACH DATA SHEET						
Bus manufacturer:	BYD Coach&Bus LLC					
Bus model:	K9MD					
Understructure manufacturer:	BYD					
Model number:	NA					
Size/Type of Bus	40ft					
Basic Body Construction						
Type:	Semi-monocoque body					
Tubing or frame member thickness and dimensions						
Overstructure	Aluminum tube from 1.57” × 2” × 0.12” to 11.09” × 2” × 0.12”					
Understructure	Steel tube from 1.18” × 1.18” × 0.06” to 6.3” × 2.36” × 0.24”					
Skin thickness and material						
Roof	0.06 in. Aluminum					
Sidewall	0.08 in. Aluminum					
Skirt panel	0.08 in. Aluminum					
Front end	0.12 in. Fiberglass					
Rear end	0.12 in. Fiberglass					
Dimensions						
Overall length	Over bumpers	40	ft	10.8	in	
	Over Body	39	ft	3.5	in	
Overall width	Over body excluding mirrors	8	ft	6	in	
	Over body including mirrors-driving position	10	ft	0	in	
	Over tires front axles	6	ft	11	in	
	Over tires center axle	NA	ft	NA	in	
	Over tires rear axles	6	ft	3	In	
Overall height (maximum)		11	ft	2	in	
Overall height (main roof line)		9	ft	7	in	

Angle of approach	≥8.6	deg	
Breakover angle	≥8	deg	
Breakover angle (rear)	NA	deg	
Angle of departure	≥8.6	deg	

Doorway Dimensions	**Front**		**Rear**	

Width between door posts	Bottom 45.2 Top 39.1	in.	41.3	in.
Door width between panels	36.9	in.	37.9	in.
Clear door width	33.7	in.	33.7	in.
Doorway height	77	in.	77	in.
Knuckle clearance	＞0.8	in.	＞0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	11.7	in.	R1	9.4	deg	a.	13	in.
Unkneeled	b.	14.8	in.	R2	11.9	deg	b.	14.2	in.

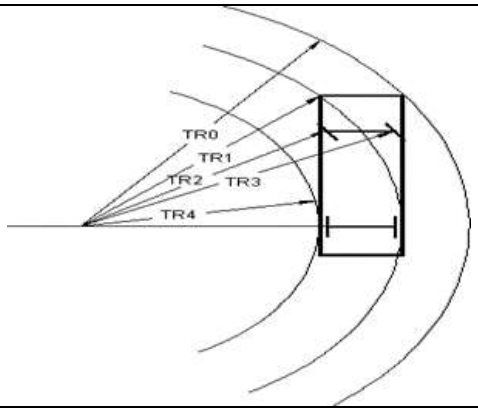
Interior head room (center of aisle)		
Front axle location	96	in.
Center axle location	NA	in.
Rear axle location	74	in.
Aisle width between transverse seats	≥22	in.

Floor height above ground (centerline of bus)		
At front door	14.8	in.
At front axle	16.1	in.
At drive axle	37	in.
At rear door	14.2	in.

Minimum ground clearance (between bus and ground, with bus unkneeled)		
Excluding axles	10.3	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)				
Outside body turning radius, TR0 (including bumper)	43	ft	7.2	in.

Front inner corner radius, TR1	38	ft	2.4	in.
Front wheel inner turning radius, TR2	33	ft	3.6	in.
Front wheel outer turning radius, TR3	38	ft	10.8	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	23	ft	0	in.



Wheelbase

Front	284	in.
Rear	NA	in.

Overhang, centerline of axle over bumper

Front	87	in.
Rear	120	in.

Floor

Interior length	36	ft.	5.8	in.
Interior width (excluding coving)	7	ft.	11	in.
Total standee area (approximately)	47.6	sq ft.		
Minimum distance between wheelhouses:	Front		35.5	in.
	Rear		23.5	in.
	Center		NA	in.
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	42	
Standee capacity	18	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox	0	6118	6172	12290	NA	NA	NA	11371	11479	22850	35140
Fully seated, full fuel and farebox	42+1	7013	6912	13925	NA	NA	NA	13947	13718	27665	41590
Fully loaded standee and fully seated, full fuel and farebox	60+1	7868	7788	15656	NA	NA	NA	14344	14290	28634	44290
Crush load (1.5x fully loaded)	90+1	8134	8052	16186	NA	NA	NA	16333	16271	32604	48790
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	44754
GAWR	NA	NA	NA	16090	NA	NA	NA	NA	NA	29100	44754

Energy Storage	
Batteries – low voltage	
Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps
Batteries – high voltage	
Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	496
Standard Charge Time	3-3.5
Charging Capacity	150kW
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD
Performance	
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	2.2 kWh/mil
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	13.96
Max Gradeability	≥23
Top Speed	65
Battery Range	203

Acceleration (20 MPH)	≤10
Acceleration (40 MPH)	≤30
Top Speed (stated above)	≤60

Performance information/graphs to be attached with this form:

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

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 5000rpm		
Traction motor horsepower rating		750Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	8.6	Reverse:	8.6
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13A		
Quantity		2		
Torque Rating		750Nm*2		
kWh Rating		150kW*2		

Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi

Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	16090	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13A	
Gross Axle weight rating	29100	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Gross Axle weight rating	NA	lb.
Axle load	NA	lb.
Suspension system		
Manufacturer	ZF	
Type	First	Air
	Second	Air

	Third	NA
Springs	First	2
	Second	4
	Third	NA
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	8050 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Michelin	
Type	Radial	
Size	305/70R 22.5	
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Bosch 8098 957 124	
Type	Ball-Nut Type	
Ratio	22.2	
Power steering fluid capacity	2.11	gal
Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter	18	in.

Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in Disc Brakes SB7	
	Third:	NA	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake_____Drums__X___Discs_____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	NA	
	Part number	NA	
	Diameter	NA	in.
Brake lining/pad manufacturer	Knorr		
Type	T7400		
Brake lining/pad identification			
First:	Forward	NA	
	Reverse	NA	
Second:	Forward	NA	

	Reverse	NA
Third:	Forward	NA
	Reverse	NA
Brake linings per shoe		
First	2	
Second	2	
Third	NA	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	NA	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	NA	in.
Brake lining thickness/pad	0.827	in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	NA	sq. in.

Cooling System				
Radiator				
Manufacturer	Modine			
Type	Liquid Cooling			
Model number	PR0456580001			
Number of tubes	72			
Tubes outer diameter	0.74×0.05	in.		in.
Fins per inch	18		fins	
Fin thickness	0.0039		in.	
Total cooling and heating system capacity	5		gal	
Radiator fan speed control	1200 – 4750 rpm			

Surge tank capacity	2.28	qt	
Thermostat temperature setting:	Initial opening (fully closed)	104	°F
	Fully open	125.6	°F
Overheat alarm temperature sending unit setting	149	°F	
Shutdown temperature setting	185	°F	

Air reservoir capacity

Supply reservoir	NA	cu in.
Primary reservoir	1831	cu in.
Secondary reservoir	1831	cu in.
Packing reservoir	1831	cu in.
Accessory reservoir	5493	cu in.
Other reservoir type	1831	cu in.

Heating, ventilation and air conditioning equipment

Heating system capacity	68243	BTU/hr.
Air conditioning capacity	81891	BTU
Ventilating capacity	589	CFM

Compressor

Manufacturer		Panasonic		
Model		C650		
Number of cylinders		1		
Drive ratio		NA		
Maximum warranted speed		NA	rpm	
Operating speed		Variable	rpm (recommended)	
Weight		51.8	lb.	
Oil capacity	Dry	0.5	gal	
	Wet	NA	gal	
Refrigerant:	Type	R410a	14.3	**lb.**

Condenser

Manufacturer	NA
Model	NA
Number of fins/in.	NA

Outer diameter of tube	0.08	in.
Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.
Fin thickness	0.004	in.
Number of evaporators	NA	

Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		
Make	BYD	
Model	NA	
Capacity	34130	Btu

Interior lighting			
Manufacturer	I/O Controls		
Type	NICHIA 757 8 LED PCB		
Number of fixtures	12		
Size of fixtures	72''		
Power pack	IOC-8001-803		
Doors			
Front			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Rear			
Manufacturer of operating equipment	Vapor		
Type of door	Slide Glide		
Type of operating equipment	Electric		
Passenger windows			
Front			
Manufacturer	Ricon		
Model	NA		
Type	Hidden Frame		
Number:	Side	12+1(driver side)	
	Rear	NA	
Sizes: 57.8" x 45.2" / 60.2" x 45.2" (L)	47.8" x 45.2" / 60.0" x 45.2" (L)	60.0" x 45.2" / 60.0" x 45.2" (L)	
54.0" x 45.2" / 57.8" x 45.2" (R)	37.4" x 45.2" / 45.9" x 45.2" (R)	60.0" x 45.2" / 60.0" x 45.2" (R)	
Glazing:	Type	Tempered	
	Thickness	3/16''	
	Color of tint	Grey	
	Light transmission	≥50%	
Mirrors			

	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	6.85'' x 14.7''	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA
Left side exterior	6.85'' x 14.7''	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA
Center rearview	8'' x 16''	Flat	Safefleet	A1706-1	NA
Front entrance area	6''	Round, Convex	Safefleet	A1712	NA
Upper-right corner	6''	Round, Convex	Safefleet	A1712	NA
Rear exit area	12''	Round, Convex	Safefleet	A6011-1	NA

Seats

Passenger	
Manufacturer	FREEDMAN
Model	4-ONE GEMINI
Type	Cantilever

Operator	
Manufacturer	Recaro
Model and part number	800.00.7R1.CC11
Type	Air Control

Paint

Manufacturer	Axalta / PPG
Type	Fast drying, oil based

Wheelchair ramp equipment

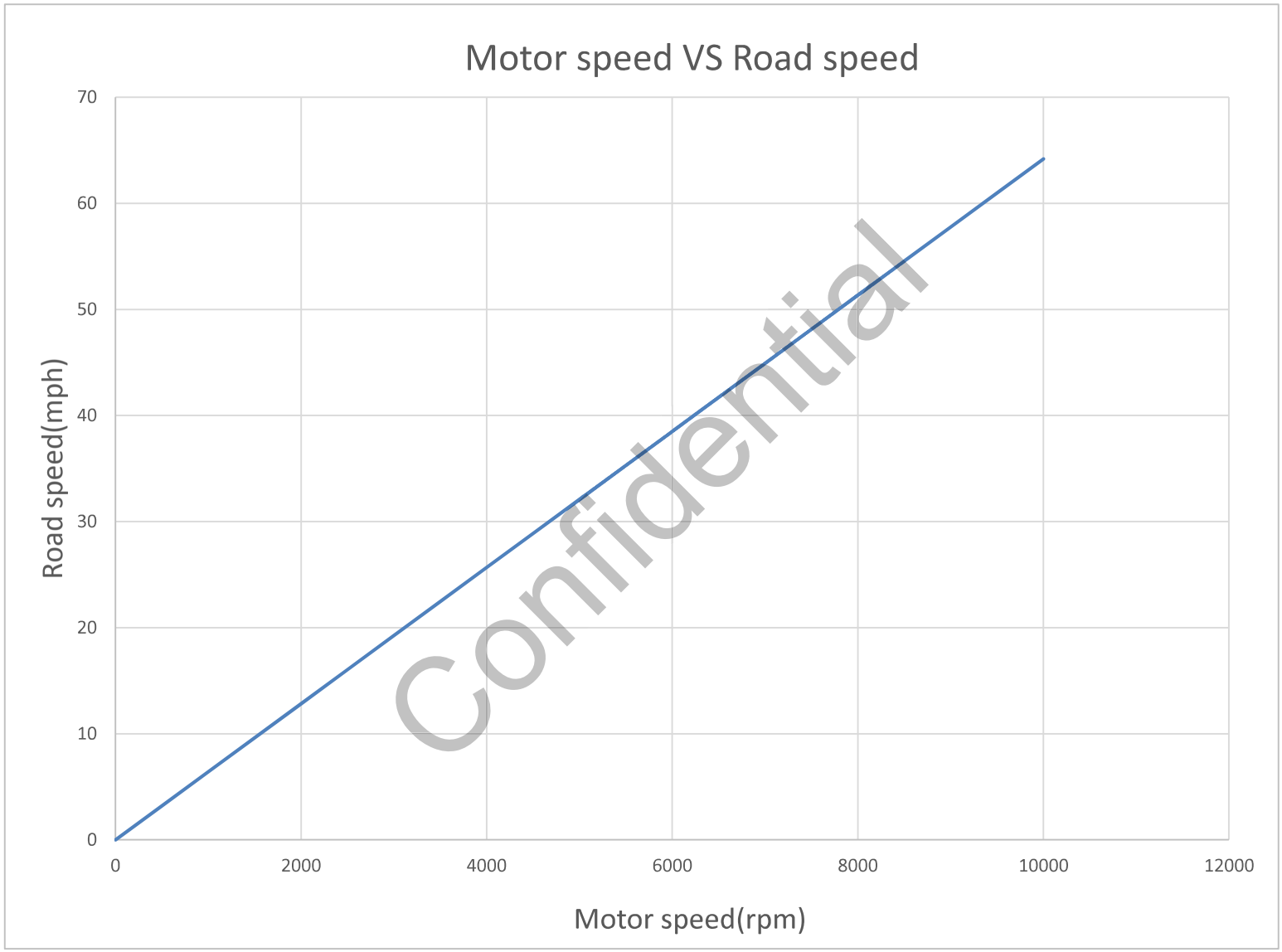
Manufacturer	Ricon	
Model number	SSR-0M27291Y00	
Capacity	1000	lb.
Width of platform	30	in.
Length of platform	51.4	in.
System fluid capacity	NA	qt
Type of fluid used	NA	
Operating hydraulic pressure	NA	psi

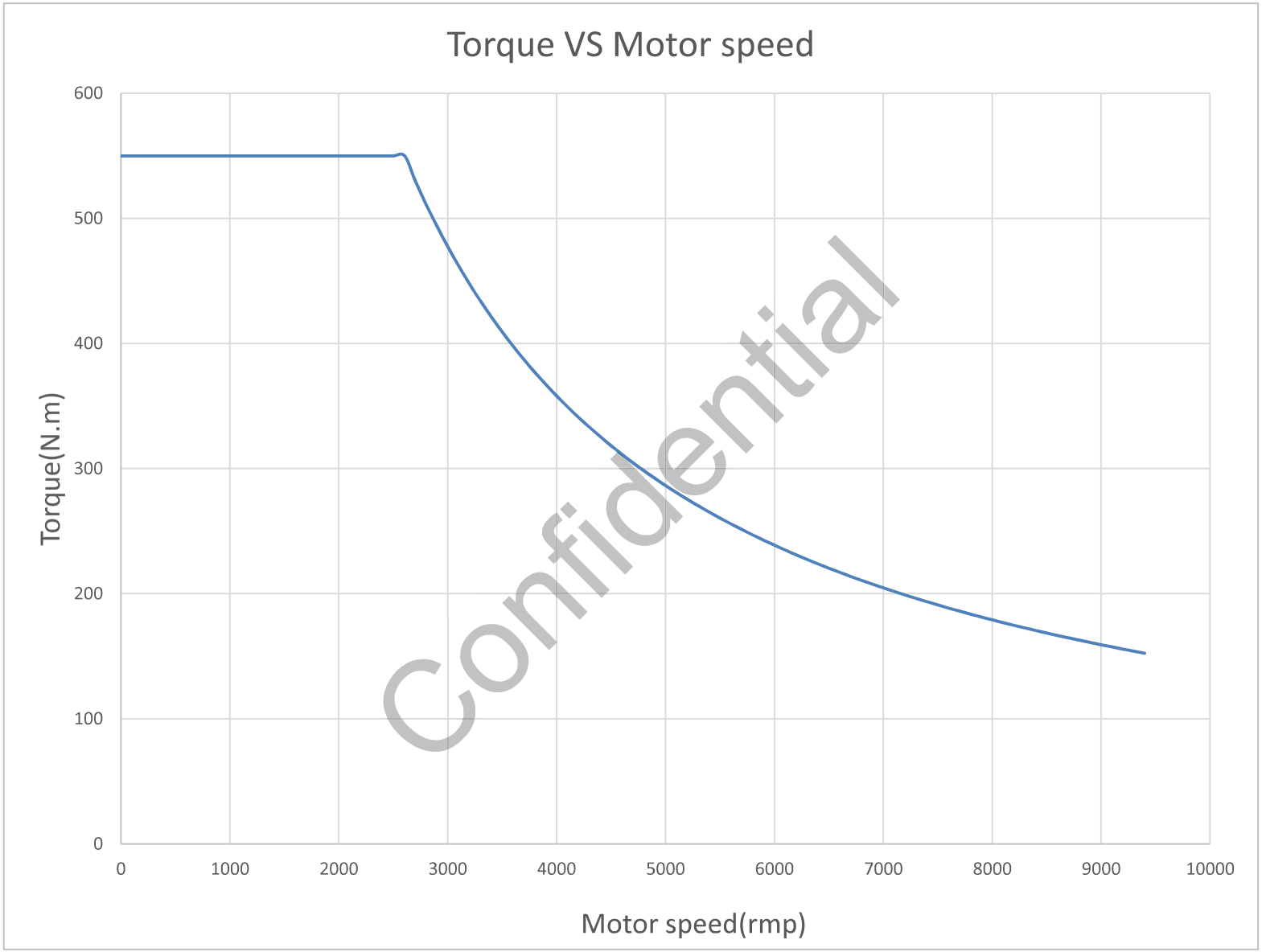
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4-point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.
Electrical		
Multiplex System		
Manufacturer	I/O Controls	
Model number	G4	

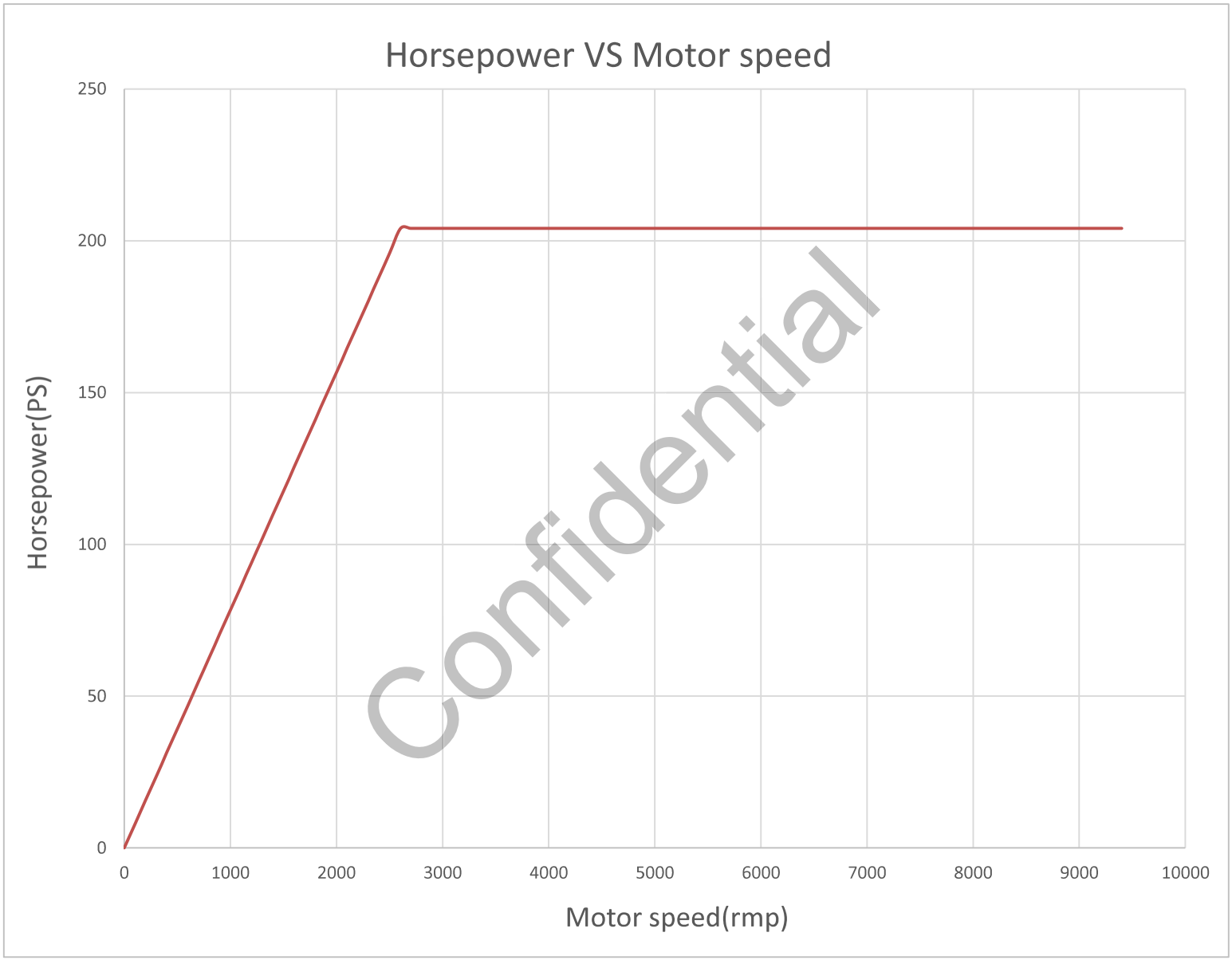
Batteries				
Manufacturer	Odyssey			
Model number	31-PC2150			
Type	AGM			
Communication System				
GPS				
Manufacturer	I/O Controls			
Model number	IO VDL G4			
PA system				
	Manufacturer	**Model number**	**Number**	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	
Energy Storage				
Type	LFP			
Number of cells	3.2	V		
Battery pack voltage	730	V		
Weight	7,800	lb.		
Security camera system				
Manufacturer	Luminator(or Customer preference)			
Model number	RR-HDRK12-4000			
Number of cameras	10			
Storage capacity	10TB			
Bike racks				
Manufacturer	SportWorks(or Customer preference)			
Model number	2 position			
Fire Detection System				
Manufacturer	Amerex			

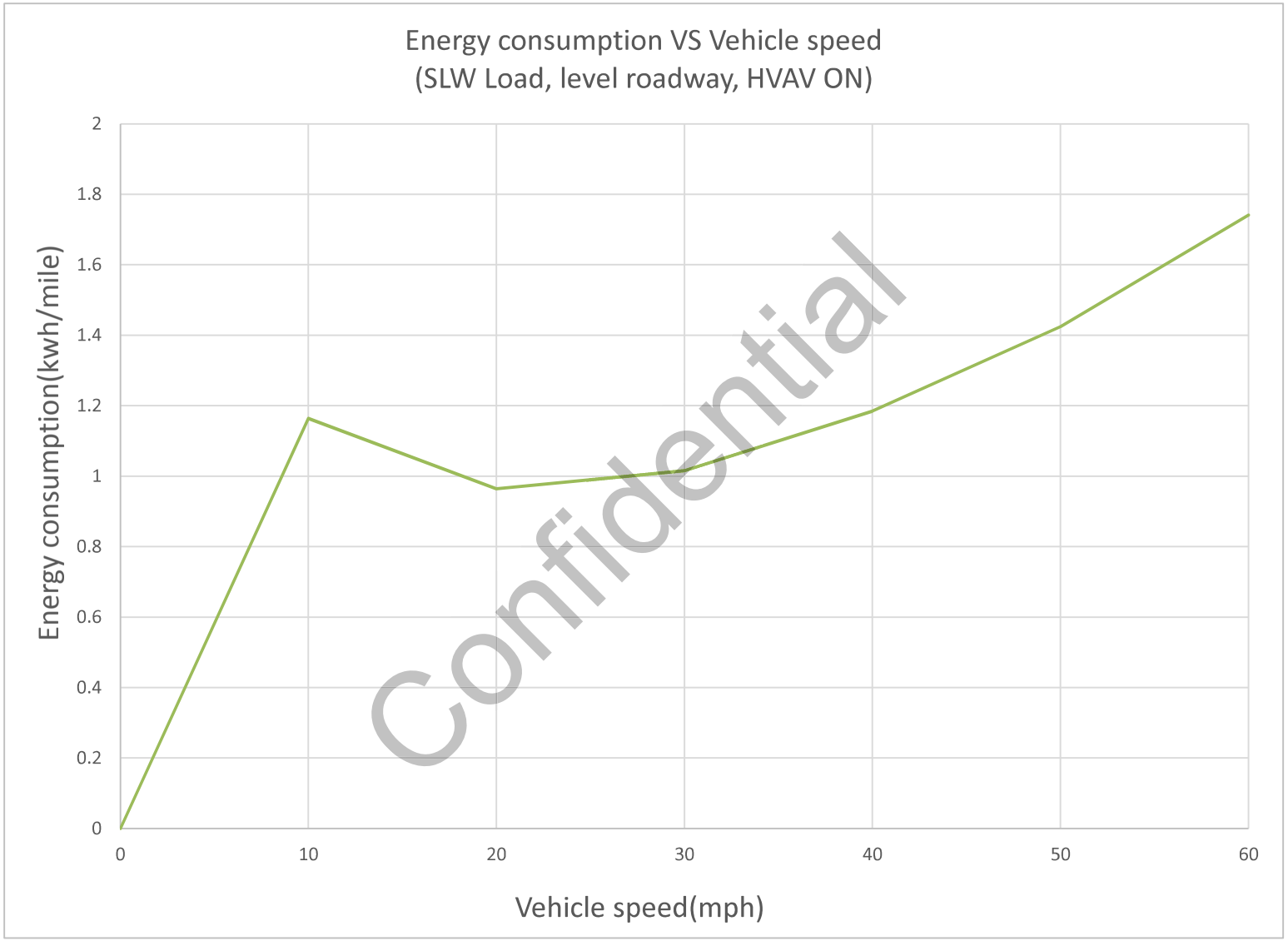
Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	8	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number a.	118-300-0110PL	
b.	118-300-0101PL	
c.	118-300-0102PL	
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	**Model number**
Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

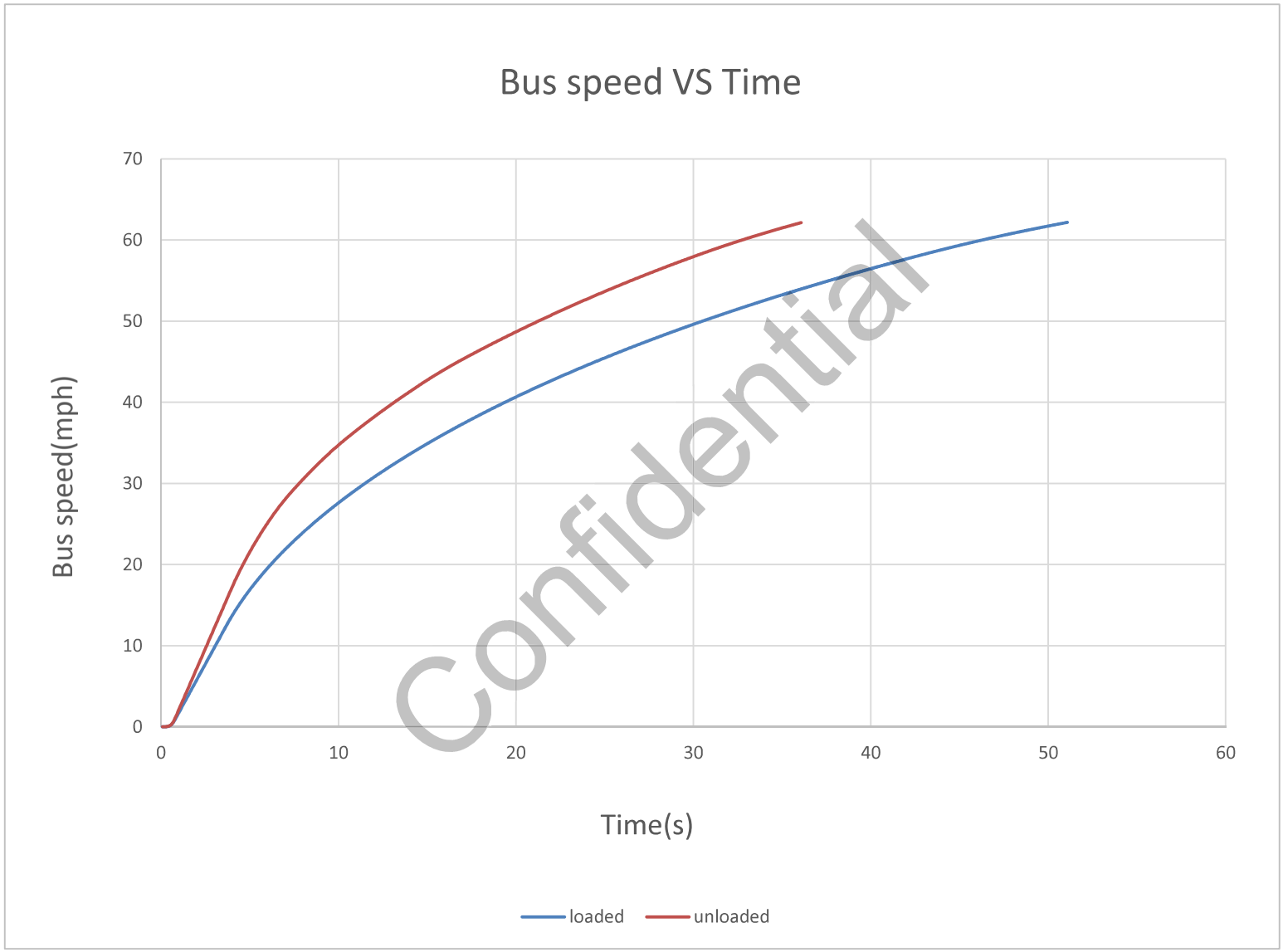
NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.


Motor speed VS Road speed
Road speed(mph)
70
60
50
40
30
20
10
0
0
2000
4000
6000
8000
10000
12000
Motor speed(rpm)
Confidential


Torque VS Motor speed
600
500
400
300
200
100
0
Torque(N.m)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Horsepower VS Motor speed
250
200
150
100
50
0
Horsepower(PS)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Energy consumption VS Vehicle speed
(SLW Load, level roadway, HVAV ON)
Energy consumption(kwh/mile)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
Vehicle speed(mph)
Confidential



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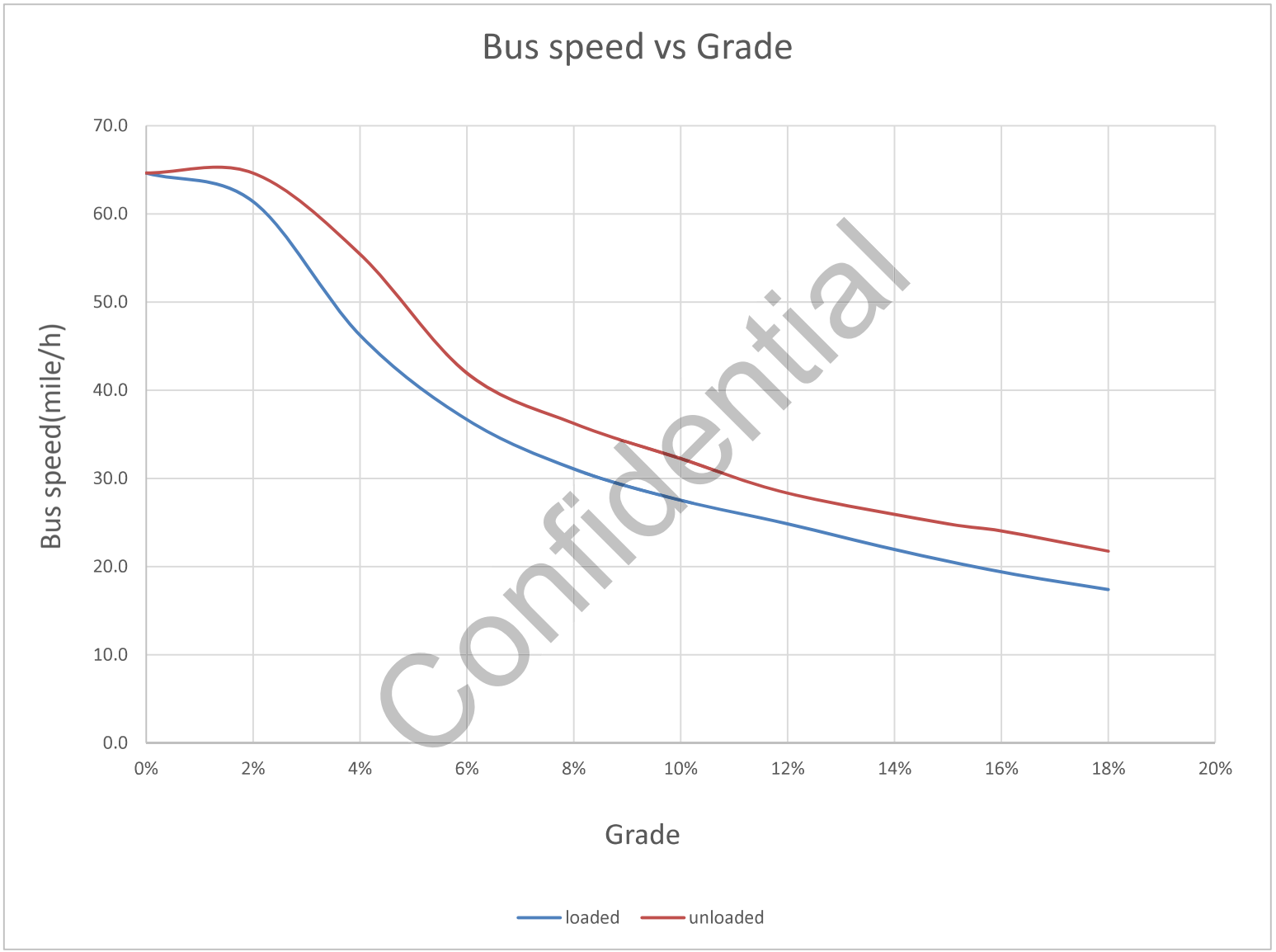

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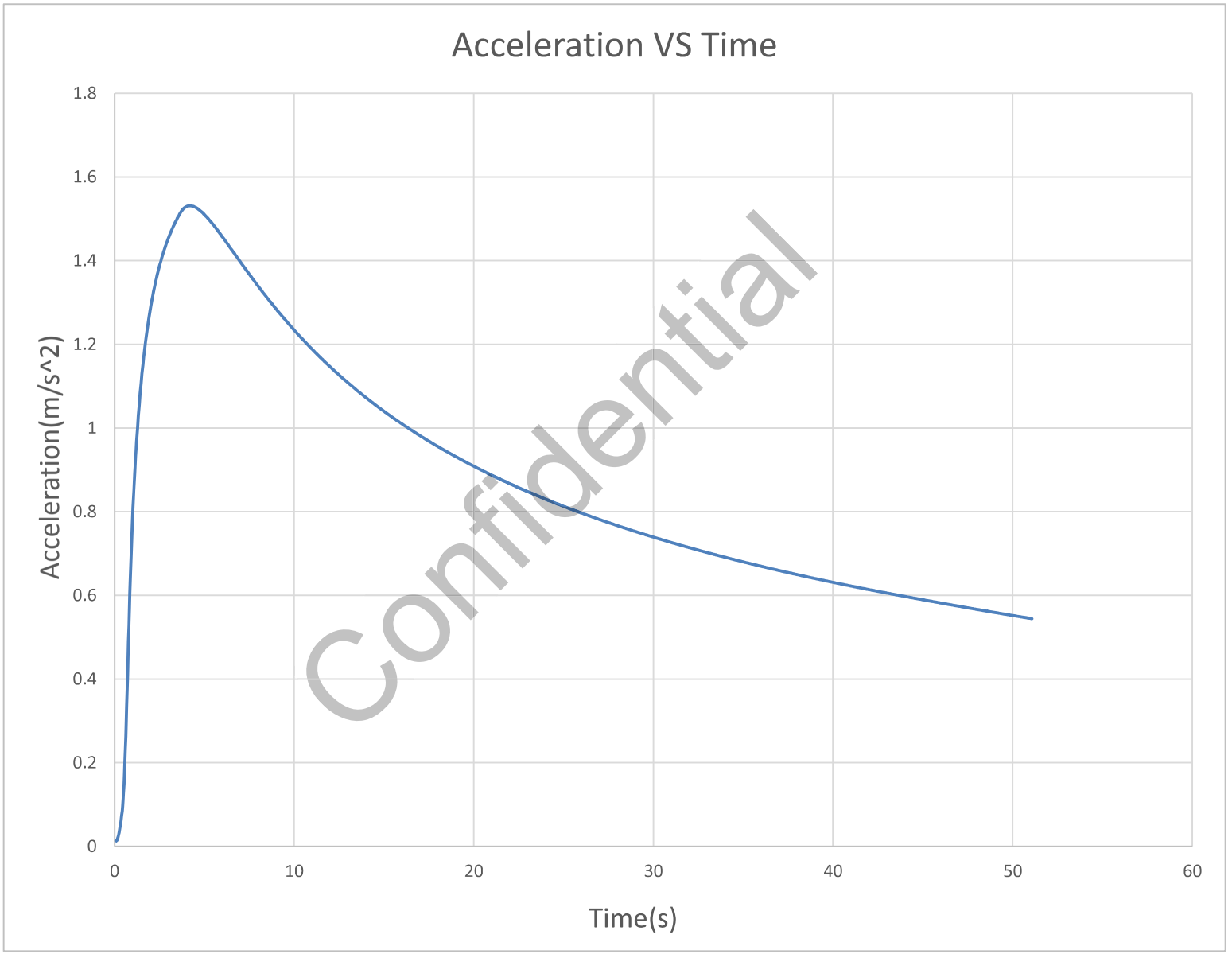
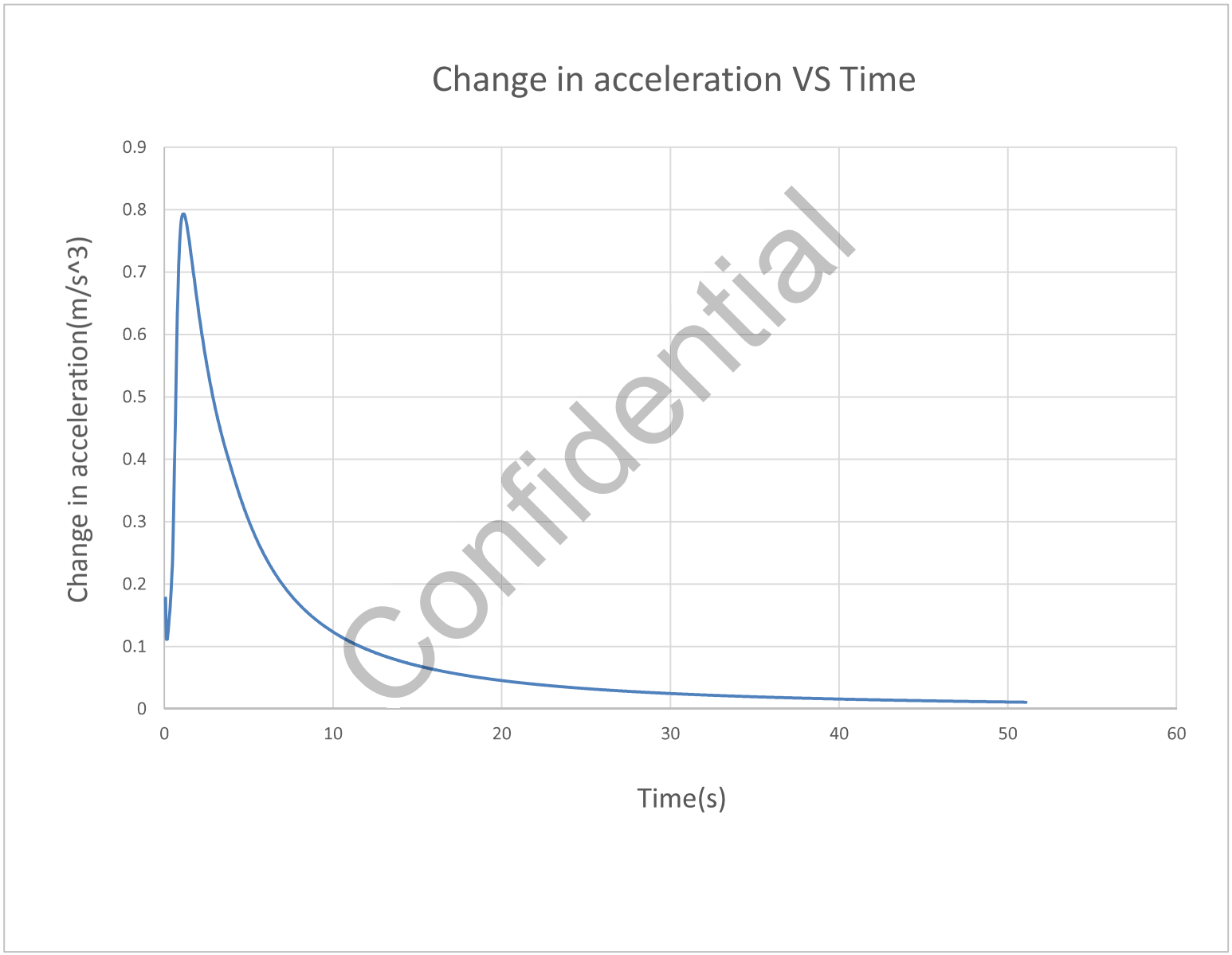

Acceleration VS Time
Acceleration(m/s^2)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
Time(s)
Confidential



Confidential

CER 10 VEHICLE TECHNICAL QUESTIONNAIRE C10M 45FT

CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

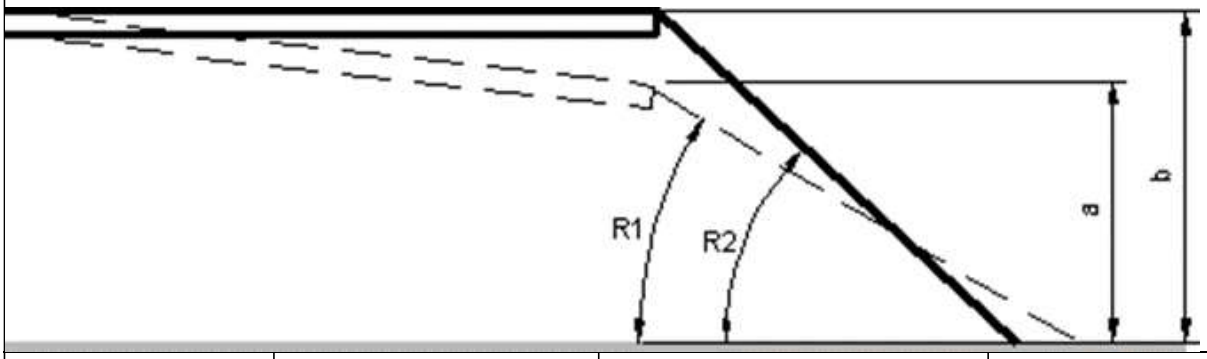
GENERGAL COACH DATA SHEET						
Bus manufacturer:	BYD Coach&Bus LLC					
Bus model:	C10M					
Understructure manufacturer:	BYD					
Model number:	NA					
Size/Type of Bus	45ft					
Basic Body Construction						
Type:	Semi-monocoque body					
Tubing or frame member thickness and dimensions						
Overstructure	StainlessSteel (2" x 4" with 0.1" thickness, major tubing)					
Understructure	StainlessSteel (2"x3" with 0.18 thickness, major tubing)					
Skin thickness and material						
Roof	0.06 in. Aluminum and 0.12 in. Fiberglass					
Sidewall	0.12 in. Fiberglass					
Skirt panel	0.08 in. Aluminum					
Front end	0.12 in. Fiberglass					
Rear end	0.12 in. Fiberglass					
Dimensions						
Overall length	Over bumpers	45	ft	9.6	in	
	Over Body	44	ft	11.6	in	
Overall width	Over body excluding mirrors	8	ft	5.6	in	
	Over body including mirrors-driving position	10	ft	0.7	in	
	Over tires front axles	8	ft	1.7	in	
	Over tires center axle	8	ft	3.1	in	
	Over tires rear axles	8	ft	3.1	In	
Overall height (maximum)		11	ft	7.4	in	
Overall height (main roof line)		11	ft	7.4	in	

Angle of approach	≥8.6	deg	
Breakover angle	≥8	deg	
Breakover angle (rear)	NA	deg	
Angle of departure	≥8.6	deg	

Doorway Dimensions	**Front**		**Rear**	
Width between door posts	N/A	in.	N/A	in.

Door width between panels	36	in.	47.8	in.
Clear door width	30	in.	42	in.
Doorway height	90	in.	68	in.
Knuckle clearance	N/A	in.	N/A	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	12	in.	R1	/	deg	a.	54.6	in.
Unkneeled	b.	14.8	in.	R2	/	deg	b.	57.4	in.

Interior head room (center of aisle)

Front axle location	≥77	in.
Center axle location	≥77	in.
Rear axle location	≥77	in.
Aisle width between transverse seats	≥22	in.

Floor height above ground (centerline of bus)

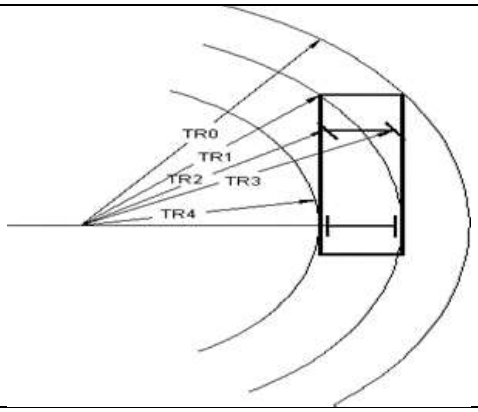
At front door	14.8	in.
At front axle	52.7	in.
At drive axle	57.4	in.
At rear door	57.4	in.

Minimum ground clearance (between bus and ground, with bus unkneeled)

Excluding axles	9	in.
Including axles	7.5	in.

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper)	49	ft	0	in.
Front inner corner radius, TR1	42	ft	9.6	in.
Front wheel inner turning radius, TR2	38	ft	2.4	in.
Front wheel outer turning radius, TR3	43	ft	10.8	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	27	ft	4.8	in.



Wheelbase

Front	313.8	in.
Rear	53.2	in.

Overhang, centerline of axle over bumper

Front	81	in.
Rear	101.6	in.

Floor

Interior length	40	ft.	0.1	in.
Interior width (excluding coving)	7	ft.	11.6	in.
Total standee area (approximately)	0	sq ft.		
Minimum distance between wheelhouses:	Front		22	in.
	Rear		22	in.
	Center		22	in.
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	57	
Standee capacity	0	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	**Front axle**			**Center axle**			**Rear axle**			**Total bus**
		Left	Right	Total	Left	Right	Total	Left	Right	Total	
Empty bus, full fuel and farebox	0	6665	6881	13546	9774	10146	19920	4684	4840	9524	42990

Fully seated, full fuel and farebox	57+1	8477	8488	16965	11746	11800	23546	5586	5593	11179	51690
Fully loaded standee and fully seated, full fuel and farebox	57+1	8477	8488	16965	11746	11800	23546	5586	5593	11179	51690
Crush load (1.5x fully loaded)	85+1	9165	9178	18343	12700	12759	25459	6040	6048	12088	55890
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	54000
GAWR	NA	NA	NA	17,640	NA	NA	29100	NA	NA	17,640	64380

Energy Storage	
Batteries – low voltage	
Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps
Batteries – high voltage	
Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	496
Standard Charge Time	2-2.5
Charging Capacity	100kWx2, AC
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD
Performance	
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	2.6 kWh/mile
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	12.96
Max Gradeability	≥16
Top Speed	65
Battery Range	172
Acceleration (20 MPH)	≤10

Acceleration (40 MPH)	≤30
Top Speed (stated above)	≤60

Performance information/graphs to be attached with this form:

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

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 5000rpm		
Traction motor horsepower rating		750Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	8.6	Reverse:	8.6
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13A		
Quantity		2		
Torque Rating		750Nm*2		
kWh Rating		150kW*2		
Air Compressor				

Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi

Axles

First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 82 A	
Gross Axle weight rating	17,600	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13A	
Gross Axle weight rating	28,660	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	ZF	
Type	RL82A	
Model Number	4474 075 501	
Gross Axle weight rating	17,600	lb.
Axle load	See weight table	lb.
Suspension system		
Manufacturer	ZF	
Type	First	Air
	Second	Air
	Third	Air

Springs	First	2
	Second	4
	Third	2
Joint		
Manufacturer	NA	
Type	NA	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	9090 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Goodyear (Customer Options)	
Type	Radial	
Size	315/80 R22.5	
Load range/air pressure	Psi 9090(single)/8270(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Henglong Z17-3411005	
Type	Z17-3411005	
Ratio	23.27	
Power steering fluid capacity	2.11	gal
Maximum effort at steering wheel	9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter	18	in.

Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in. HFL1 Disc Brakes SN7	
	Third:	24 in. Disc Brakes SN7	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake_____Drums__X___Discs_____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Brake lining/pad manufacturer	Knorr		
Type	T7400		
Brake lining/pad identification			
First:	Forward	NA	
	Reverse	NA	
Second:	Forward	NA	
	Reverse	NA	

Third:	Forward	NA
	Reverse	NA
Brake linings per shoe		
First	2	
Second	2	
Third	2	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	4.3	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	9.748	in.
Brake lining thickness/pad	0.827	in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	60.14	sq. in.
Cooling System		
Radiator		
Manufacturer	BYD	
Type	Liquid Cooling	
Model number	K7A-1300010	
Number of tubes	60	
Tubes outer diameter	0.63x0.059 in.	in.
Fins per inch	3.87	fins
Fin thickness	0.003	in.
Total cooling and heating system capacity	6.8	gal
Radiator fan speed control	800-900 rpm	
Surge tank capacity	2.75	qt

Thermostat temperature setting:	Initial opening (fully closed)	98.6	°F
	Fully open	125.6	°F
Overheat alarm temperature sending unit setting	149	°F	
Shutdown temperature setting	185	°F	

Air reservoir capacity			
Supply reservoir		NA	cu in.
Primary reservoir		3661	cu in.
Secondary reservoir		1831	cu in.
Packing reservoir		1831	cu in.
Accessory reservoir		5493	cu in.
Other reservoir type		NA	cu in.

Heating, ventilation and air conditioning equipment			
Heating system capacity		68243	BTU/hr.
Air conditioning capacity		81891	BTU
Ventilating capacity		589	CFM

Compressor				
Manufacturer		Panasonic		
Model		C650		
Number of cylinders		1		
Drive ratio		NA		
Maximum warranted speed		NA	rpm	
Operating speed		Variable	rpm (recommended)	
Weight		51.8	lb.	
Oil capacity	Dry	0.5	gal	
	Wet	NA	gal	
Refrigerant:	Type	R410a	14.3	**lb.**

Condenser			
Manufacturer		NA	
Model		NA	
Number of fins/in.		NA	
Outer diameter of tube		0.08	in.

Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.
Fin thickness	0.004	in.
Number of evaporators	NA	
Expansion valve		

Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		
Make	BYD	
Model	NA	
Capacity	34130	Btu

Interior lighting			
Manufacturer		I/O Controls	
Type		NICHIA 757 8 LED PCB	
Number of fixtures		12	
Size of fixtures		72''	
Power pack		IOC-8001-803	
Doors			
Front			
Manufacturer of operating equipment		Domestic suppliers	
Type of door		Air-operated Swing Plug	
Type of operating equipment		Rockswitch	
Rear			
Manufacturer of operating equipment		Ventura	
Type of door		Manual hinged door	
Type of operating equipment		Rockswitch	
Passenger windows			
Front			
Manufacturer		Ricon	
Model		NA	
Type		Hidden Frame	
Number:		Side	16+1(driver side)
		Rear	NA
Sizes:	51.1"x41.1"	58.3"x56.6" / 56.6"x55.9"	47.5"x41.1" /47.5"x41.1"
	51.3"x41.1"	47.5"x41.1" /47.5"x41.1"	47.5"x41.1" /47.5"x41.1"
	52.4"x41.1" /52.4"x41.1"	52.4"x41.1" /52.4"x41.1"	52.4"x41.1" /40"x41.1"
Glazing:		Type	Tempered
		Thickness	3/16''
		Color of tint	Grey
		Light transmission	≥50%
Mirrors			

	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	8” x 18”	Flat/Convex	Safefleet	/	M14F13AC-6-TS1
Left side exterior	8” X 18”	Flat/Convex	Safefleet	/	M14F12AC-TS1
Center rearview	9.5” X 6.5”	Convex	Hadley-transit	/	A1709-2
Front entrance area	N/A	N/A	N/A	N/A	N/A
Upper-right corner	N/A	N/A	N/A	N/A	N/A
Rear exit area	N/A	N/A	N/A	N/A	N/A

Seats

Passenger	
Manufacturer	Freedman 4 One/ Torino G/ Viscount Hi-Tech
Model	PREMIUM
Type	3 point seat belt

Operator	
Manufacturer	Recaro
Model and part number	800.00.7R1.CC11
Type	Air Control

Paint

Manufacturer	Axalta / PPG
Type	Fast drying, oil based

Wheelchair ramp equipment

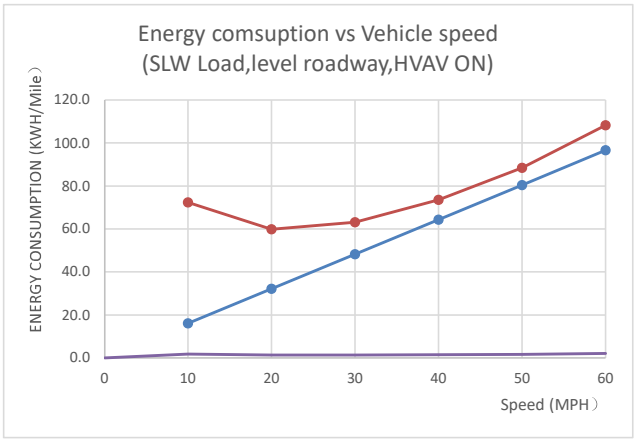
Manufacturer	**NA**	
Model number		
Capacity		lb.
Width of platform		in.
Length of platform		in.
System fluid capacity		qt
Type of fluid used		
Operating hydraulic pressure		psi

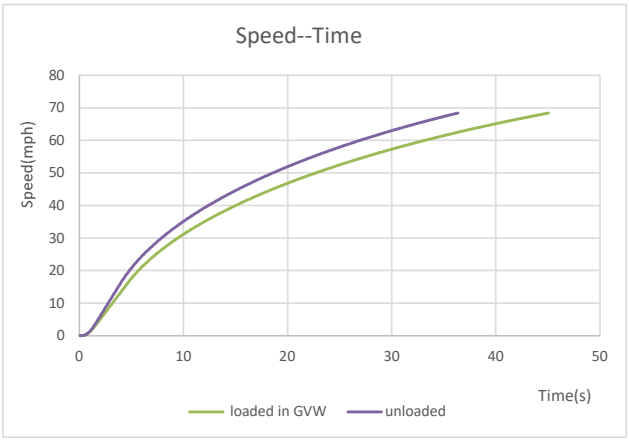
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	X2 (Or Customer Preference)	
Model number	NA	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.
Electrical		
Multiplex System		
Manufacturer	I/O Controls	
Model number	G4	

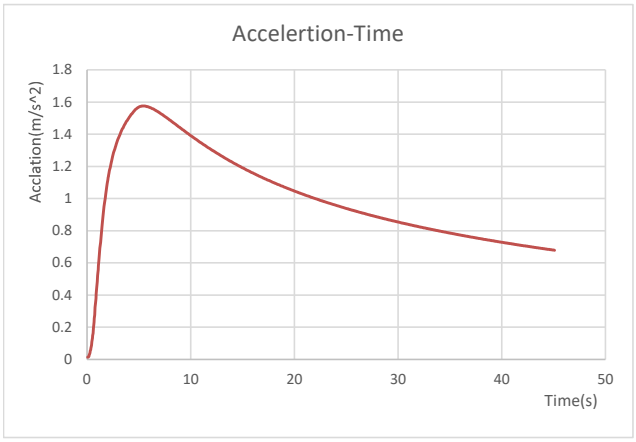
Batteries				
Manufacturer	Odyssey			
Model number	31-PC2150			
Type	AGM			
Communication System				
GPS				
Manufacturer	I/O Controls			
Model number	IO VDL G4			
PA system				
	Manufacturer	**Model number**	**Number**	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	
Energy Storage				
Type	LFP			
Number of cells	3.2	V		
Battery pack voltage	730	V		
Weight	7,800	lb.		
Security camera system				
Manufacturer	Luminator(or Customer preference)			
Model number	RR-HDRK12-4000			
Number of cameras	10			
Storage capacity	10TB			
Bike racks				
Manufacturer	SportWorks(or Customer preference)			
Model number	2 position			
Fire Detection System				
Manufacturer	Amerex			

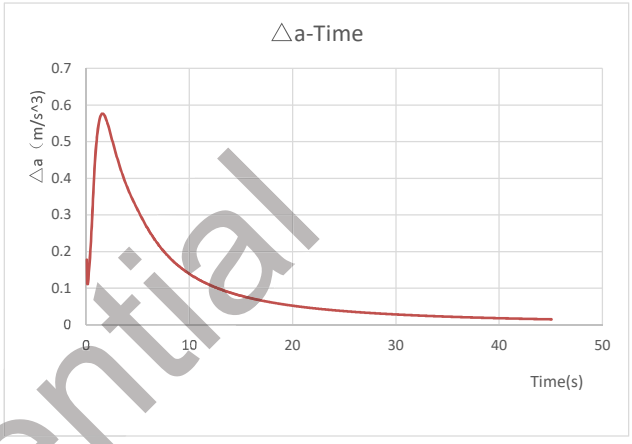
Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	8	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number a.	118-300-0110PL	
b.	118-300-0101PL	
c.	118-300-0102PL	
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	**Model number**
Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

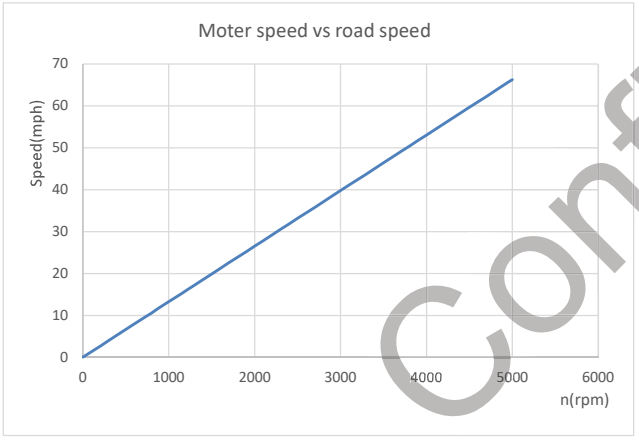
NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.

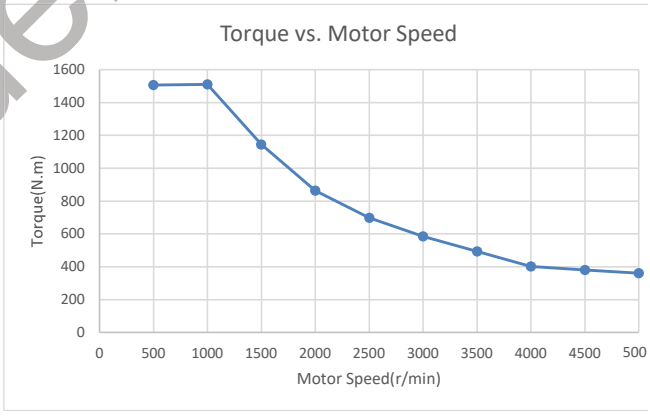


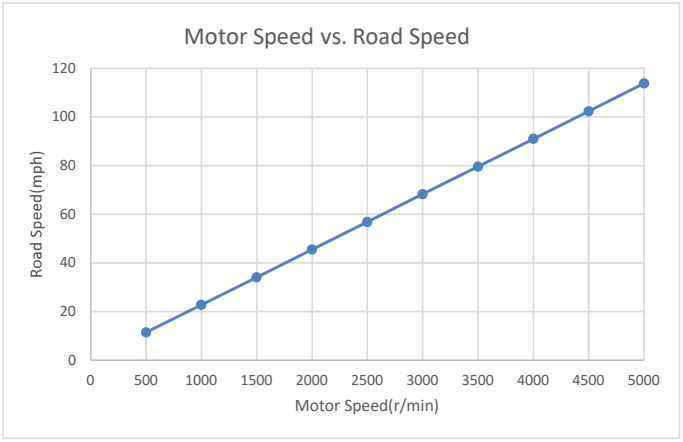


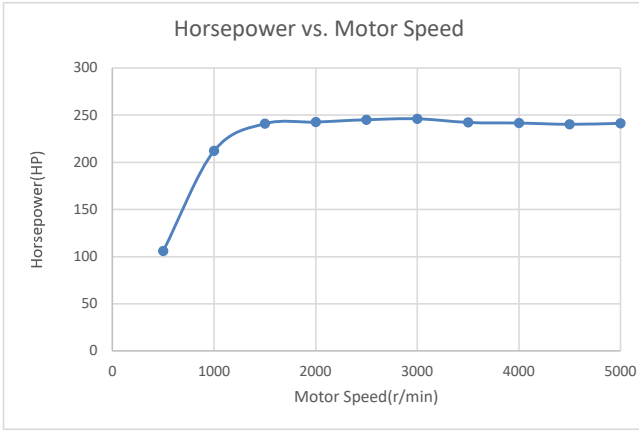












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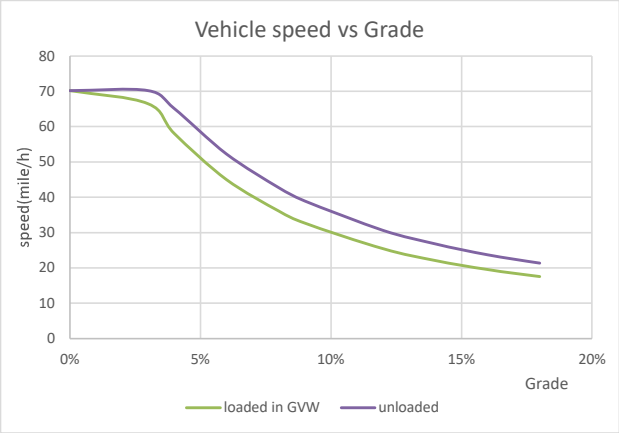

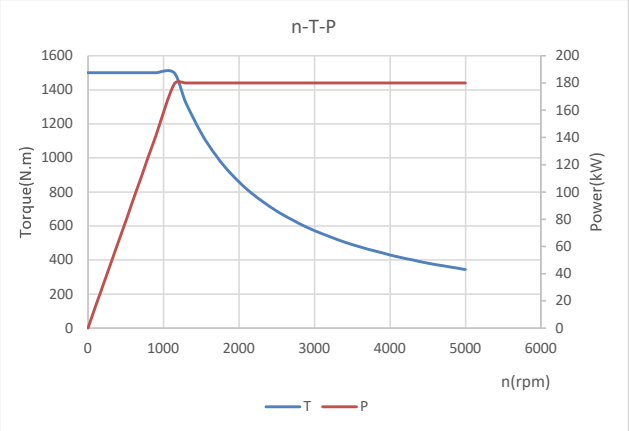

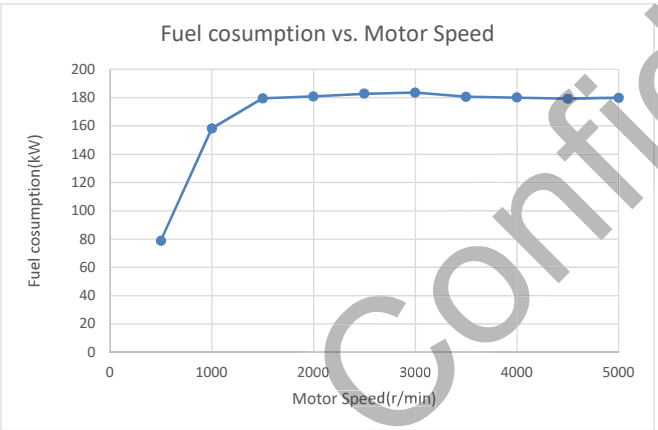

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CER 10 VEHICLE TECHNICAL QUESTIONNAIRE K11M 60FT

CER 10. Vehicle Technical Information

This form must be completed and included in the Technical Proposal. NOTE—one form must be completed for each type of bus submitted in the response to this RFP

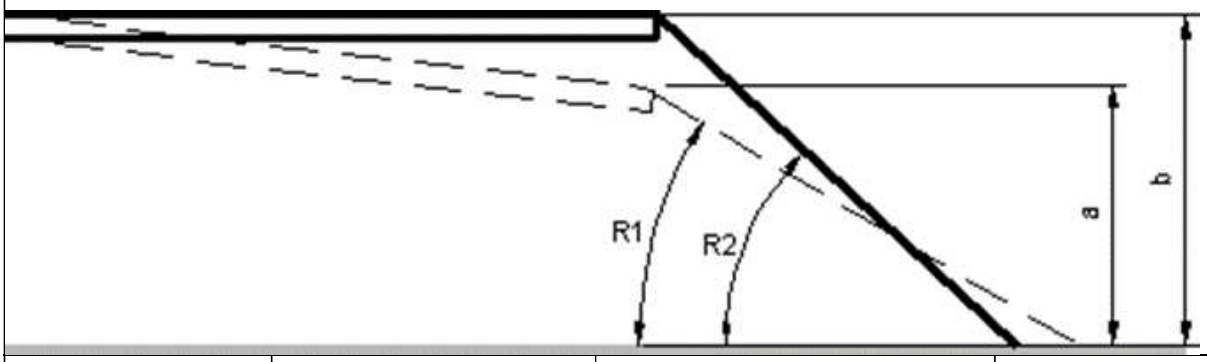
GENERGAL COACH DATA SHEET						
Bus manufacturer:	BYD Coach&Bus LLC					
Bus model:	K11M					
Understructure manufacturer:	BYD					
Model number:	NA					
Size/Type of Bus	60ft					
Basic Body Construction						
Type:	Semi-monocoque body					
Tubing or frame member thickness and dimensions						
Overstructure	Aluminum tube from 1.57” × 2” × 0.12” to 11.09” × 2” × 0.12”					
Understructure	Steel tube from 1.18” × 1.18” × 0.06” to 6.3” × 2.36” × 0.24”					
Skin thickness and material						
Roof	0.06 in. Aluminum					
Sidewall	0.08 in. Aluminum					
Skirt panel	0.08 in. Aluminum					
Front end	0.12 in. Fiberglass					
Rear end	0.12 in. Fiberglass					
Dimensions						
Overall length	Over bumpers	60	ft	8.4	in	
	Over Body	59	ft	9	in	
Overall width	Over body excluding mirrors	8	ft	6	in	
	Over body including mirrors-driving position	10	ft	0	in	
	Over tires front axles	6	ft	11	in	
	Over tires center axle	6	ft	3	in	
	Over tires rear axles	6	ft	3	In	
Overall height (maximum)		11	ft	2	in	
Overall height (main roof line)		9	ft	7	in	

Angle of approach	≥8.6	deg	
Breakover angle	≥8	deg	
Breakover angle (rear)	NA	deg	
Angle of departure	≥8.6	deg	

Doorway Dimensions	**Front**		**Rear**	

Width between door posts	Bottom 45.2 Top 39.1	in.	43	in.
Door width between panels	36.9	in.	36.8	in.
Clear door width	34.3	in.	34.7	in.
Doorway height	77.2	in.	76.5	in.
Knuckle clearance	＞0.8	in.	＞0.8	in.

Step height from ground measured at center of doorway



	Front doorway, empty			Ramp angle			Rear Doorway, empty		
Kneeled	a.	12.6	in.	R1	10	deg	a.	12.6	in.
Unkneeled	b.	15.4	in.	R2	12.4	deg	b.	15.4	in.

Interior head room (center of aisle)

Front axle location	96	in.
Center axle location	92	in.
Rear axle location	74	in.
Aisle width between transverse seats	≥22	in.

Floor height above ground (centerline of bus)

At front door	15.4	in.
At front axle	15.4	in.
At drive axle	38.6	in.
At rear door	15.4	in.

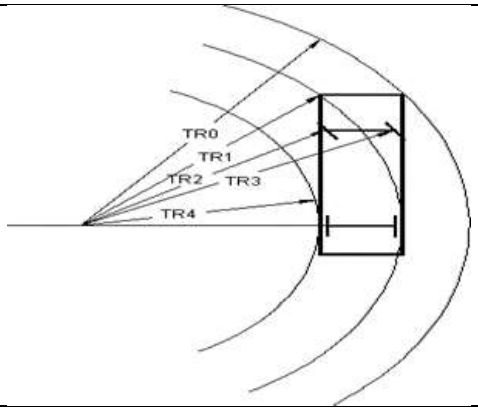
Minimum ground clearance (between bus and ground, with bus unkneeled)

Excluding axles	10.4	in.
Including axles	5.8	in.

Horizontal turning envelope (see diagram below)

Outside body turning radius, TR0 (including bumper)	39	ft	4.8	in.
Front inner corner radius, TR1	33	ft	8.4	in.
Front wheel inner turning radius, TR2	25	ft	9.6	in.

Front wheel outer turning radius, TR3	34	ft	2.4	in.
Inside Body Turning Radius innermost point, TR4 (including bumper)	15	ft	3.6	in.



Wheelbase

Front	239.6	in.
Rear	275.6	in.

Overhang, centerline of axle over bumper

Front	87	in.
Rear	126.6	in.

Floor

Interior length	54	ft.	7	in.
Interior width (excluding coving)	7	ft.	11	in.
Total standee area (approximately)	51	sq ft.		
Minimum distance between wheelhouses:	Front		35.5	in.
	Rear		35.8	in.
	Center		23.1	in.
Maximum interior floor slope (from horizontal)	3.3	deg		

Passenger capacity provided

Total maximum seating	55	
Standee capacity	34	
Minimum hip to knee room	26	in.
Minimum foot room	14	in.

Weight

	No. of people	Front axle			Center axle			Rear axle			Total bus
		Left	Right	Total	Left	Right	Total	Left	Right	Total	

Empty bus, full fuel and farebox	0	4880	4756	9636	9894	9692	19596	11735	12183	23918	53150
Fully seated, full fuel and farebox	55+1	5730	5588	11318	11349	11131	22480	13,614	14104	27718	61550
Fully loaded standee and fully seated, full fuel and farebox	89+1	6792	6732	13524	13670	11724	25394	13910	13822	27732	66650
Crush load (1.5x fully loaded)	133+1	7465	7399	14,863	15024	12885	27909	15287	15191	30478	73250
GVWR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	67450
GAWR	NA	NA	NA	15652	NA	NA	25353	NA	NA	28660	67450

Energy Storage	
Batteries – low voltage	
Manufacturer	Odyssey
Type	AMG
Model Numbers	31-PC2150
Cold Cranking Amps	1150
Cranking Amps	1370 Amps
Reserve Capacity	205 Amps
Batteries – high voltage	
Manufacturer	BYD
Type	LFP
Model Number	K01/K02
Total Battery Capacity (kWh)	642
Standard Charge Time	4-4.5
Charging Capacity	150kW
Operating Temperature Range	10 °F to 115 °F
Cooling/Heating System	BYD
Performance	
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	3.0 kWh/mil
Fuel Economy (w/full passenger load, HVAC, and all electric accessories in use)	11.235
Max Gradeability	≥15

Top Speed	65
Battery Range	193
Acceleration (20 MPH)	≤10
Acceleration (40 MPH)	≤30
Top Speed (stated above)	≤60

Performance information/graphs to be attached with this form:

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

Traction Motor/Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Speeds		Max 5000rpm		
Traction motor horsepower rating		750Nm*2		
Type ventilation/cooling		Liquid cooling		
Gear ratios	Forward:	8.6	Reverse:	8.6
Voltage Equalizer				
Manufacture		Vamer Incorporated		
Model		80-100-015-01-LVD		
Auxiliary Inverter (120/240)				
Manufacturer		COTEK		
Model		SD3500-124		
Inverter Technology		Step-up DC-AC inverter		
Output Voltage		100/110/115/120VAC ±3%		
Traction /Drive Motor				
Manufacturer		BYD		
Type		Permanent Magnet Synchronous Motor/3 Phase		
Model		BYDEQ13A		
Quantity		2		
Torque Rating		750Nm*2		

kWh Rating	150kW*2	
Air Compressor		
Manufacture	Knorr	
Type	Oil Flooded Screw	
Rated Capacity	11.4	CFM
Capacity at idle (approximately)	5.4	CFM
Capacity at maximum speed (engine)	18.3	CFM
Maximum warranted speed	4000	rpm
Speed idle	1500	rpm
Drive Type	Electric	
Governor:		
Cut-in pressure	105+/-5	psi
Cut-out pressure	125+/-5	psi
Axles		
First		
Manufacturer	ZF	
Type	Low Floor Front Axle	
Model Number	RL 75 A	
Gross Axle weight rating	15652	lb.
Axle load	See weight table	lb.
Second		
Manufacturer	ZF	
Type	Center Axle	
Model Number	AVN132	
Gross Axle weight rating	25353	lb.
Axle load	See weight table	lb.
Third		
Manufacturer	BYD	
Type	In-wheel Motor Drive Axle	
Model Number	BYDEQ13A	
Gross Axle weight rating	28660	lb.
Axle load	See weight table	lb.
Suspension system		
Manufacturer	ZF	

Type	First	Air
	Second	Air
	Third	Air
Springs	First	2
	Second	4
	Third	4
Joint		
Manufacturer	Hubner	
Type	14220035000	
Model Number	NA	
Wheels and Tires		
Wheels		
Make	Alcoa	
Size	22.5 in x 8.25 in	
Capacity	8050 lbs	
Material	Aluminum Alloy	
Tires		
Manufacture	Goodyear (Customer Options)	
Type	Radial	
Size	305/70R 22.5	
Load range/air pressure	Psi 8050(single)/7390(dual) lbs / 130 psi	
Steering, power		
Pump		
Manufacture and model number	BYD	
Type	EHPS	
Relief pressure	2611	psi
Booster/gear box		
Manufacture and model number	Bosch 8098 957 124	
Type	Ball-Nut Type	
Ratio	22.2	
Power steering fluid capacity	2.11	gal

Maximum effort at steering wheel		9.35	lb (unloaded stationary coach on dry asphalt pavement)
Steering wheel diameter		18	in.
Brakes			
Make and fundamental brake system	Knorr		
Brake chambers vendor size and part number	First:	24 in Disc Brakes SN7	
	Second:	24 in Disc Brakes SB7	
	Third:	24 in Disc Brakes SN7	
Brake operation effort	NA		
Slake adjuster's vendors' type and part numbers			
First:	Right:	NA	
	Left:	NA	
Second:	Right:	NA	
	Left:	NA	
Third:	Right:	NA	
	Left:	NA	
Length:	First take-up:	NA	
	Second take-up:	NA	
	Third take-up:	NA	
Brake_____Drums__X___Discs_____ (Placing X denoting type)			
First:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Second:	Manufacturer	KNORR	
	Part number	NA	
	Diameter	22.5	in.
Third:	Manufacturer	Knorr	
	Part number	NA	
	Diameter	22.5	in.
Brake lining/pad manufacturer	Knorr		
Type	T7400		
Brake lining/pad identification			

First:	Forward	NA
	Reverse	NA
Second:	Forward	NA
	Reverse	NA
Third:	Forward	NA
	Reverse	NA

Brake linings per shoe		
First	2	
Second	2	
Third	2	
Brake lining widths		
First	4.3	in.
Second	4.3	in.
Third	4.3	in.
Brake lining/pad lengths		
First	9.748	in.
Second	9.748	in.
Third	9.748	in.
Brake lining thickness/pad	0.827	in.
Brake lining/pad per axle		
First	60.14	sq. in.
Second	60.14	sq. in.
Third	60.14	sq. in.

Cooling System

Radiator				
Manufacturer	Modine			
Type	Liquid Cooling			
Model number	PR0456580001			
Number of tubes	72			
Tubes outer diameter	0.74x0.05	in.		in.
Fins per inch	18		fins	

Fin thickness	0.0039		in.	
Total cooling and heating system capacity	5		gal	
Radiator fan speed control	1200-4750 rpm			
Surge tank capacity	2.28		qt	
Thermostat temperature setting:	Initial opening (fully closed)		104	°F
	Fully open		125.6	°F
Overheat alarm temperature sending unit setting	149		°F	
Shutdown temperature setting	185		°F	

Air reservoir capacity

Supply reservoir	NA	cu in.
Primary reservoir	1831	cu in.
Secondary reservoir	1831	cu in.
Packing reservoir	1831	cu in.
Accessory reservoir	5493	cu in.
Other reservoir type	1831	cu in.

Heating, ventilation and air conditioning equipment

Heating system capacity	68243x2	BTU/hr.
Air conditioning capacity	81891x2	BTU
Ventilating capacity	589x2	CFM

Compressor

Manufacturer		Panasonic		
Model		C650		
Number of cylinders		1		
Drive ratio		NA		
Maximum warranted speed		NA	rpm	
Operating speed		Variable	rpm (recommended)	
Weight		51.8	lb.	
Oil capacity	Dry	0.5	gal	
	Wet	NA	gal	
Refrigerant:	Type	R410a	14.3	**lb.**

Condenser

Manufacturer	NA	
Model	NA	
Number of fins/in.	NA	
Outer diameter of tube	0.08	in.
Fin thickness	NA	in.
Condenser Fan		
Manufacturer	SPAL	
Model	VA89	
Fan diameter	12	in.
Speed maximum	3400	rpm
Flow rate (maximum)	NA	CFM
Receiver		
Manufacturer	NA	
Model		
Capacity		
Condenser fan drive motors		
Manufacturer	SPAL	
Model	NA	
Type	Brushless	
Horsepower	0.27	hp
Operating speed	2600	rpm
Evaporator fan drive motors		
Manufacturer	NA	
Model	NA	
Type	NA	
Horsepower	0.74	hp
Operating speed	1400	rpm
Evaporator(s)		
Manufacturer	BYD	
Model	NA	
Number of rows	18	
Number of fins/in.	NA	
Outer diameter of tube	0.28	in.

Fin thickness	0.004	in.
Number of evaporators	NA	
Expansion valve		
Manufacturer	BYD	
Model	NA	
Filter-drier		
Manufacturer	BYD	
Model	NA	
Heater cores		
Manufacturer	BYD	
Model	PTC	
Capacity	NA	Btu/hr.
Number of rows	NA	
Number of fins/in.	NA	
Outer diameter of tube	NA	in.
Fin thickness	NA	in.
Number of heater cores	NA	
Floor heater blowers		
Front	2 (optional)	
Rear	2 (optional)	
Controls		
Manufacturer	BYD	
Model	PTC	
Driver's heater		
Manufacturer	BYD	
Model	Electric Driven PTC	
Capacity	4095	Btu/hr.
Ventilation system		
Type	Centrifugal	
Coolant Heater		

Make	BYD	
Model	NA	
Capacity	34130	Btu
Interior lighting		
Manufacturer	I/O Controls	
Type	NICHIA 757 8 LED PCB	
Number of fixtures	12	
Size of fixtures	72''	
Power pack	IOC-8001-803	
Doors		
Front		
Manufacturer of operating equipment	Vapor	
Type of door	Slide Glide	
Type of operating equipment	Electric	
Rear		
Manufacturer of operating equipment	Vapor	
Type of door	Slide Glide	
Type of operating equipment	Electric	
Passenger windows		
Front		
Manufacturer	Ricon	
Model	NA	
Type	Hidden Frame	
Number:	Side	15+1(driver side)
	Rear	NA
Sizes: 42.2" x 44.6" / 46.5" x 44.6" (L)	47.8" x 44.6" / 57.8" x 44.6" (L)	47.8" x 44.6" / 45.7" x 44.6" (L)
54.1" x 44.6" / 42.2" x 44.6" (R)	42.2" x 44.6" / 57.8" x 44.6" (R)	45.7" x 44.6" / 52.0" x 44.6" (R) 62.7" x 44.6" (R)
52.0" x 44.6" / 62.7" x 44.6" (L)		
Glazing:	Type	Tempered
	Thickness	3/16''

	Color of tint	Grey
	Light transmission	≥50%

Mirrors

	Size	Type	Manufacturer	Part no.	Model no.
Right side exterior	6.85'' x 14.7''	Remote control	Safefleet	RS-7-D815HRFHRCX-OTS	NA
Left side exterior	6.85'' x 14.7''	Remote control	Safefleet	CS-2-1 D815HRFHRCX-OTS AR	NA
Center rearview	8'' x 16''	Flat	Safefleet	A1706-1	NA
Front entrance area	6''	Round, Convex	Safefleet	A1712	NA
Upper-right corner	6''	Round, Convex	Safefleet	A1712	NA
Rear exit area	12''	Round, Convex	Safefleet	A6011-1	NA

Seats

Passenger

Manufacturer	FREEDMAN
Model	4-ONE GEMINI
Type	Cantilever

Operator

Manufacturer	Recaro
Model and part number	800.00.7R1.CC11
Type	Air Control

Paint

Manufacturer	Axalta / PPG
Type	Fast drying, oil based

Wheelchair ramp equipment

Manufacturer	Ricon	
Model number	SSR-0M27291Y00	
Capacity	1000	lb.

Width of platform	30	in.
Length of platform	51.4	in.
System fluid capacity	NA	qt
Type of fluid used	NA	
Operating hydraulic pressure	NA	psi
Hydraulic cylinders:	Size	NA
	Number	NA
Wheelchair securement equipment		
Manufacturer	Q'Straint (or Customer Preference)	
Model number	4 point securement (or Customer Preference)	
Destination signs		
Manufacturer	I/O Controls	
Type	Diamond Dot Destination Sign System	
Character length		
Front destination	4.25	in.
Front route	4.628	in.
Curbside destination	3.75	in.
Rear route	4	in.
Character height		
Front destination	6.625	in.
Front route	8.125	in.
Curbside destination	5	in.
Rear route	6.25	in.
Number of characters		
Front destination	10	
Front route	3	
Curbside destination	9	
Rear route	3	
Message width		
Front destination	64	in.
Front route	14	in.
Curbside destination	44	in.
Rear route	17.25	in.

Electrical

Multiplex System

Manufacturer	I/O Controls
Model number	G4

Batteries

Manufacturer	Odyssey
Model number	31-PC2150
Type	AGM

Communication System

GPS

Manufacturer	I/O Controls
Model number	IO VDL G4

PA system

	Manufacturer	Model number	Number	
Amplifier	REI	REI-700890	1	
Microphone	REI	REI-480054BK	1	
Internal speakers	REI	220010	8	
External speaker	REI	230049	1	

Energy Storage

Type	LFP	
Number of cells	3.2	V
Battery pack voltage	730	V
Weight	10,065	lb.

Security camera system

Manufacturer	Luminator(or Customer preference)
Model number	RR-HDRK12-4000
Number of cameras	10
Storage capacity	10TB

Bike racks

Manufacturer	SportWorks(or Customer preference)	
Model number	2 position	
Fire Detection System		
Manufacturer	Amerex	
Model number	V25 / VH25 ABC	
Fire detectors	Yes	
Type (thermal or optical)	Thermal	
Number of detectors	14	
Automatic voice annunciator system		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	IVN 3TN/301-221-1029	
Annunciator LED sign		
Number of signs	2	
Housing dimensions	33.24*4 in	
Character length	33	in.
Character height	4	in.
Character width	2.16	in.
GPS antenna		
Manufacturer	Clever Device – Or Customer Preference	
Model and part number	2467	
Automatic passenger counter		
Manufacturer	Clever Device- Or Customer Preference	
Model and part number a.	118-300-0110PL	
b.	118-300-0101PL	
c.	118-300-0102PL	
Sensor type	Reflective Infrared Sensor	
Real-time bus arrival prediction system		
	Manufacturer	**Model number**

Router	Optional-Customer Preference	
Cellular modem	Optional-Customer Preference	
Charge protection	Optional-Customer Preference	

NOTE: All information above is accurate to the timeframe upon submission. The Agency reserves the right to update above data if changes occur, upon consultation with the customer.

REFERENCES AND NON-PRICED INFORMATION

ANTELOPE VALLEY TRANSPORTATION AUTHORITY

LANCASTER, CA

Customer Contact: Macy Neshati, CEO; P. 661.729.2229 E. mneshati@avta.com

Contract Date: 3.10.2016 - 6.15.2024 (Expected)

BYD was awarded this $72-million contract to design and build 85 battery electric buses of multiple sizes for the Antelope Valley Transportation Authority (AVTA). BYD will provide AVTA 30-FT, 35-FT, 40-FT, 60-FT Battery-Electric Buses along with the associated charging equipment. As of today, BYD has deliverer 46 of the vehicles.

LOS ANGELES DEPARTMENT OF TRANSPORTATION

LOS ANGELES, CA

Customer Contact: Corinne Ralph, Chief of Transit Programs; P. 213.972.8408 E. corinne.ralph@lacity.org

Contract Date: 10.25.2019 - 10.1.2022 (Expected)

BYD was awarded this $88-million contract to design and build 130 30-FT battery electric buses for Los Angeles Department of Transportation (LADOT). This contract is the largest single order for Battery-Electric Buses in the USA.

LOS ANGELES WORLD AIRPORT

LOS ANGELES, CA

Customer Contact: Charles Nelson, P. 310.703.4313 E. cnelson@lawa.org

Contract Date: 5.8.2018 - 5.8.2021

BYD was awarded this $22-million contract to design and build 20 60-FT articulated battery electric buses for one of the largest airport in the world, Los Angles World Airport (LAWA). This contract is part of the State of California goal to reduce emissions throughout the state.

ANAHEIM TRANSPORTATION NETWORK

ANAHEIM, CA

Customer Contact: Jim Appleby; P. 714.563.5287 E. jappleby@atnetwork.org

Contract Date: 7.23.2019 - 12.30.2021 (Expected)

This $25-million bus procurement contract was award to BYD. The scope of work for this project involves the manufacturing and supply of 40 Battery-Electric buses sizes 30F-FT, 40-FT, and 60-FT. These buses will be operated at part of the Anaheim Resort Transportation (ART) deploying vehicles to Disney and other tourist locations in Anaheim.

LINK TRANSIT

WENATCHEE, WA

Customer Contact: Richard DeRock, General Manager; P. 509.664.7610 E. Richard@linktransit.com

Contract Date: 4.25.2019 - 4.30.2021

As part of the Washington State Department of Enterprise Services (DGS), Link Transit bought 10 35-FT Electric buses along with BYD's 80kW AC Depot Chargers. As part of this contract, BYD installed 300kW Wireless Inductive Charging Systems for extended range extension. Contract value $7-million

TRANSIT SERVICES OF FREDERICK COUNTY

FREDERICK, MD 21702

Customer Contact: Roman Steichen, Director P. 301.600.3538 E. rsteichen@frederickcountymd.gov

Contract Date: 10.15.2018 - 9.30.2020

TransIT Services decided to procure three 30-FT bus options from BYD's contract with Martha's Vineyard Transit Authority. BYD designed and manufactured to meet TransIT expectations of an electric bus. Total Contract value: $1.6-million.

Photo Credit: Federick County.

ENGINEERING ORGANIZATION CHART, ENGINEERING CHANGE CONTROL PROCEDURE, FIELD MODIFICATION PROCESS

ENGINEERING ORGANIZATION CHART, ENGINEERING CHANGE CONTROL PROCEDURE, FIELD MODIFICATION PROCESS

ENGINEERING TEAM

Research and Development (R&D)—continual innovation in producing planet-safe, people- safe, and pocket-safe technology—is the heart and soul of BYD. Engineers make up nearly 10% of our global workforce: over 20,000 engineers in energy and vehicle development, organized into a network of innovation sharing and review, including—the BYD Auto Engineering Research Institute, which includes eight global departments comprising some 400 engineers in electric bus design alone.

BYD's vertical integration means that any major innovation that is conceived must prove itself in multiple levels of engineering reviews, as well as regulatory compliance assessments, comprehensive risk management analyses and tests, and strong quality control throughout.

This ensures that all innovations represent improvements, that are of highest quality, safety, and actual benefit to customers, as well as in full regulatory compliance—and that such innovations can be shared across the world

to maintain consistency throughout company products to the optimal extent (while also staying true to the different customer needs and regulatory requirements across our global markets).

For components manufactured by outside vendors, our engineering team woks directly these manufacturers to customize products to meet our unique specifications—and yours.

INNOVATIVE ENGINEERING

Innovation combined with diligence reflects

BYD's core values, which include:

- Continually pushing the boundaries of what counts as "our best work;" and
- Customer satisfaction, through creating products to meet clients' unique needs within their markets' framework of regulations and industry standards.
- Because we believe in continual improvement, our development process considers any and every

element that could improve product reliability and/or robustness.

- Because we also believe in caution and control, we develop, test, and implement modifications in six (6) month cycles to capture field issues and/or improve overall bus performance. This continuous and incremental improvement process allows us control, so each change can be fully tracked and assessed, without errors that might occur if too much were changed too quickly.

NEW PRODUCT DESIGN

In assessing our products, developing new or improved models, and even in making minor design changes based on client specifications, our executive and engineering teams consider both:

1. Safety concerns, including:
    - Meeting all regulations and standards, including but not limited to all applicable national, state/province, and local regulations, FMVSS (Federal Motor Vehicle Safety Standards) and FMCSR (Federal Motor Carrier Safety Regulations),
    - Identifying and taking steps to minimize any hazards, to the full extent possible, including any conceivable risk that could arise in any conceivable instance, given any conceivable condition; and
2. Efficiency concerns, i.e., to the extent possible given any safety considerations, which designs, and specifications will optimize such additional considerations as:
    - Performance of the vehicle, charger, etc.,
    - Operation ease,
    - Maintenance ease and cost,
    - Comfort and accessibility for passengers and driver, and
    - Aesthetics of design.

In addressing these two concerns, past designs, and experience with these designs in practice, as well as potential innovations or improvements, are all fully considered.

One tool we use to minimize risks and ensure both safety and continual performance, such as the risk of battery power loss, is planned redundancy: providing a backup component or system in case one fails, or an alternate option for achieving the desired result in case the first method needs to be supplemented or is less preferable to a client. Modularity goes hand in hand with planned redundancy, so that backup components are identical to the original, and so that elements used for one bus can be used for others as well.

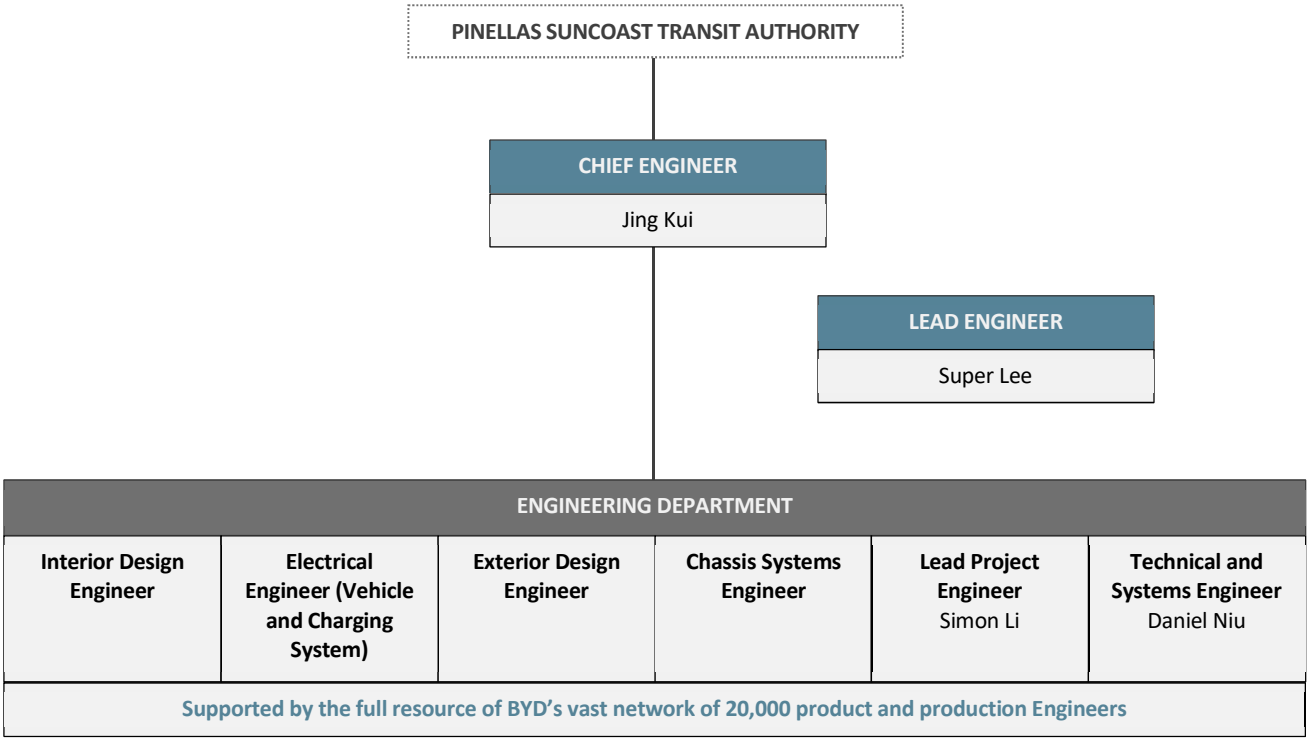
ENGINEERING TEAM

Our Engineering team will have a direct involvement in your project. We have more than 30 engineers in the US that are fully supported about our global network of 20,000 engineers.

Our Chief Engineer, JK will lead both our Design and Aftersales Engineering Departments.

- Design Engineering is split into further teams for various design areas, each with a senior engineer and other engineers.
- This team develops designs and specifications for your buses, including making any customizations to our standard designs to meet your preferences. They are also involved in any engineering changes needed or desired.
- Aftersales Engineering, which works to make any field modifications (design changes desired after delivery).

ENGINEERING ORGANIZATION CHART



ENGINEERING CHANGE CONTROL PROCEDURE AND FIELD MODIFICATION PROCESS

BYD uses documented procedures for full control of engineering changes so that no changes are made to the baseline bus design without going through a review process and obtaining BYD and Long Beach approval as required. Engineering Change Control Procedures and forms are a part of BYD's CMP. Engineering changes can be initiated from a variety of sources and involve multiple documents. Additionally, separate forms will be used for Engineering Change Notice (ECN) and Field Modification Instruction (FMI). ECN information will include the reason for the change, updated drawings, and other documentation, plan and schedule modification, vehicles affected (effectively), and FMI procedures specifying parts required, tooling, and other relevant information. Engineering changes initiating because of form, fit, function, or corrective/preventive changes are captured. The Engineering Change Management procedure also contains provisions to prioritize a change via a High Priority/Emergency classification to allow rapid processing and approval of critical changes.

CONFIGURATION MANAGEMENT PLAN

BYD's Configuration Management Plan (CMP) has been established to ensure that designs are traceable to requirements, changes are controlled and documented, and there is consistency between the product and its supporting documentation.

The CMP identifies and describes the overall procedures for configuration management of the vehicles throughout the transit life cycle of the vehicles.

Scope begins at the Notice to Proceed (NTP) and ends at the completion of general warranty. The CMP is closely associated with technical data management and interface management. The CMP will further outline the methodologies through which BYD will establish and document any changes to the baseline design.

The CMP describes procedures for the following functions:

- **Configuration Identification:** Identify all parts requiring serial numbering; specify procedures for serialization, and record serial numbers for all required items per vehicle specifying the revision level of each part for configuration control of hardware and software.
- **Change Control:** Procedures will document and control any changes to hardware and software configuration that may be initiated by suppliers, BYD, contract change orders (Modifications), engineering changes, and field modifications.

The configuration control process ensures that submittal of deliverable, such as drawings, (especially final as-built drawings), specifications, and manuals accurately record the latest revisions levels for all equipment.

MANUFACTURING FACLITY PLANT LAYOUT, OTHER CONTRACTS, STAFFING

MANUFACTURING FACLITY PLANT LAYOUT, OTHER CONTRACTS, STAFFING

BYD COACH & BUS LLC

BYD completes all major engineering, manufacturing, and assembly portions at our manufacturing facility in Lancaster, CA.

BYD's Lancaster facilities house a world-class engineering team, leading-edge manufacturing equipment, and a rapidly growing workforce for middle-class clean technology jobs. In 2017, BYD more than tripled the size of its original Coach and Bus manufacturing facility to over 600,000 square feet. This factory expansion critically enables more efficient production line layouts and vastly expanded production capacity, as well as more offices, parking, and employee facilities. This expansion will support local workforce growth from the current 800+ employees up to 1,500 staff and will also enable production of up to 1,500 American-made buses per year.

BYD's manufacturing facility is fully permitted to build electric buses from bare frame assembly to finished product, with full capabilities of welding, painting, chassis and electrical installation, final assembly, and testing.

In addition to manufacturing, this facility houses all departments relevant to bus builds, including Engineering, the Quality Department, Equipment (Warehouse), Purchasing/Procurement, Financial,

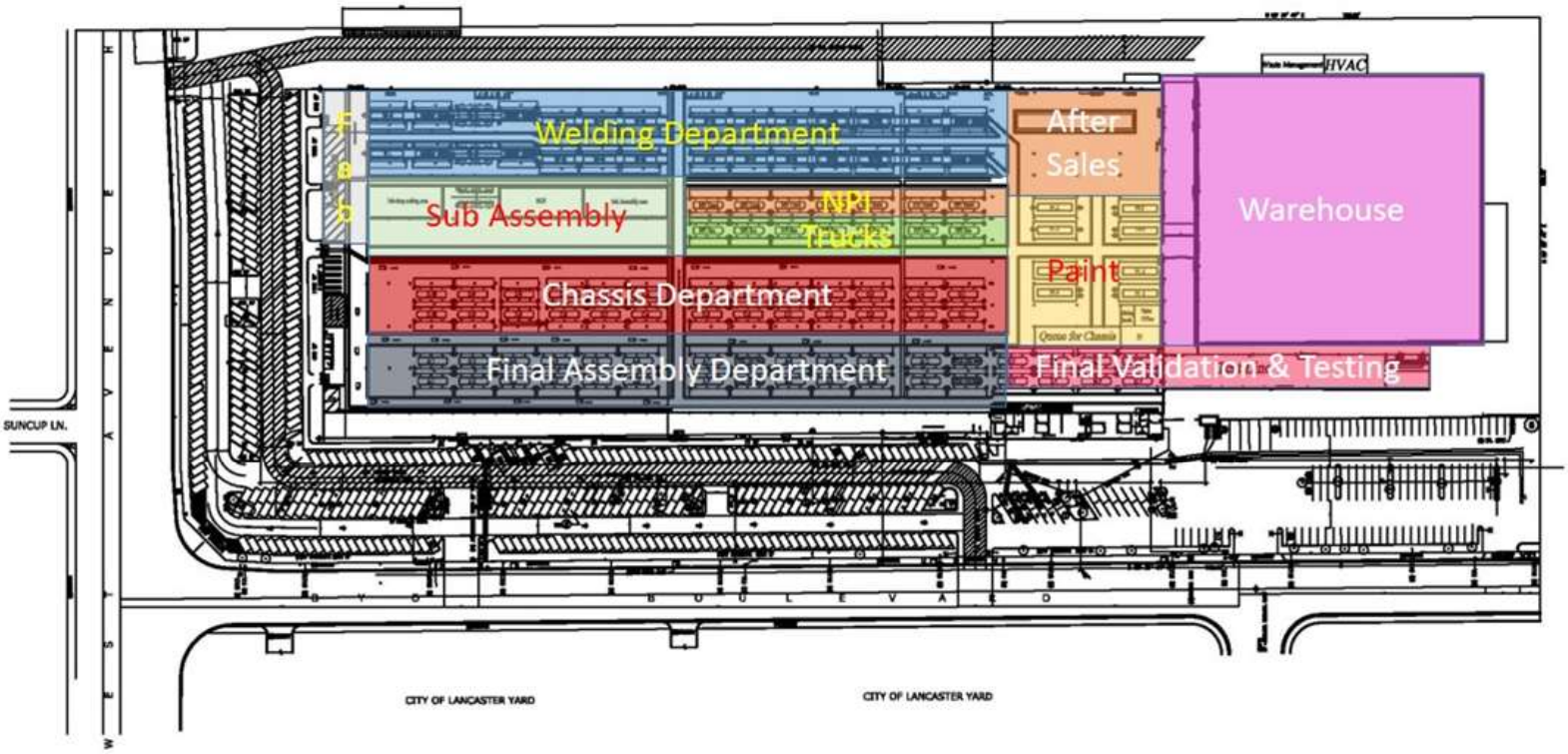
Human Resources, and Management. These departments complete the following vital project roles:

- Project management and plant management tasks
- Engineering and design modifications to existing models, for example to meet project-specific client specifications regarding seating, systems, etc.
- Purchasing, receipt, and inspection of all materials and parts
- Fabrication of select parts if/as needed, when allowed by the specifications.
- Assembling/welding of all elements within each bus structure, beginning with the body frame, which is built on-site, and its "marriage" to the chassis frame, which is shipped from our global parent.
- Painting and finishing of each bus, including full corrosion protection.
- Wiring of each bus and installation of all chassis systems and components (including from BYD and outside manufacturers) along with necessary hoses, piping, etc. (with elements from U.S. companies wherever possible)
- All final assembly tasks, including interior assembly (using products/materials from U.S. companies wherever possible), and installation of additional wiring and electronic and mechanical components/ systems (including from BYD and outside manufacturers, from the U.S. wherever possible)

Performance of all needed inspections and tests, including inspection of received materials, sub-station, and station-level inspections and (if/as relevant) tests, subline/work area (Welding, Painting, Chassis, Electrical and Assembly) inspections and (if/as relevant) tests, and all pre- delivery inspections and tests of the completed buses.

FACILITY PLANT LAYOUT

Each of the electric coaches for the City of Montebello's project will be designed, built, and delivered by BYD, the world's leading electric bus manufacturer. We will handle every aspect of this project from design through manufacturing and on to inspection and delivery at our one manufacturing facility in Lancaster, CA at 46147 BYD Blvd., Lancaster, CA 93534. Our Lancaster, CA facility covers a total area of approximately 600,000 sq ft, at which there are dedicated locations for welding; chassis and electrical equipment installation; material storage; final assembly; six state-of-the-art paint booths; and a water spray booth capable of fitting an articulated 60-foot bus, as well as a 45-foot double-decker coach.


Welding Department
Sub Assembly
NPI Trucks
Chassis Department
Final Assembly Department
After Sales
Paint
Warehouse
Final Validation & Testing
HVAC
SUNCUP LN.
CITY OF LANCASTER YARD
CITY OF LANCASTER YARD

PRODUCTION SCHEDULE AND OTHER CONTRACT COMMITMENTS FOR THE DURATION OF THIS CONTRACT

PRODUCTION SCHEDULE AND OTHER CONTRACT COMMITMENTS FOR THE DURATION OF THIS CONTRACT

PROJECT PHASES

A detailed five phase project plan is developed to identify the following key milestones in the process considering key dates that agreed upon in the contract.

Pre-Project Phase	Project Initiation/ Design Phase	Production/Build Phase	Inspections/Test & Delivery Phase	Aftersales Phase
• Review customer specifications to develop strategies to build a compliant bus • Assign a specific Project Manager and Lead Engineer • Establish initial vehicle design • Develop Preliminary Milestone Schedule	• Pre-Production Meeting to establish detailed schedule, task assignments, designs, and list of materials and parts • Discussion of bus and charger design, creates Sales and Production Order • Develop full production project milestone schedule • Create Bill of Materials (BOM) • Engineering Design freeze	• Procurement of materials • Bus Build • Charger Configuration	• First Article Inspection & Test • Pre-Delivery Inspection and Test (at BYD manufacturing facility) • Delivery and installation of charging infrastructure • Delivery of Vehicles to customer depot • Post-Delivery Inspection & Test (Customer Acceptance)	• Acceptance of Vehicles constitute transition of communication and collaboration responsibilities from the Bus Project Manager to Aftersales Department

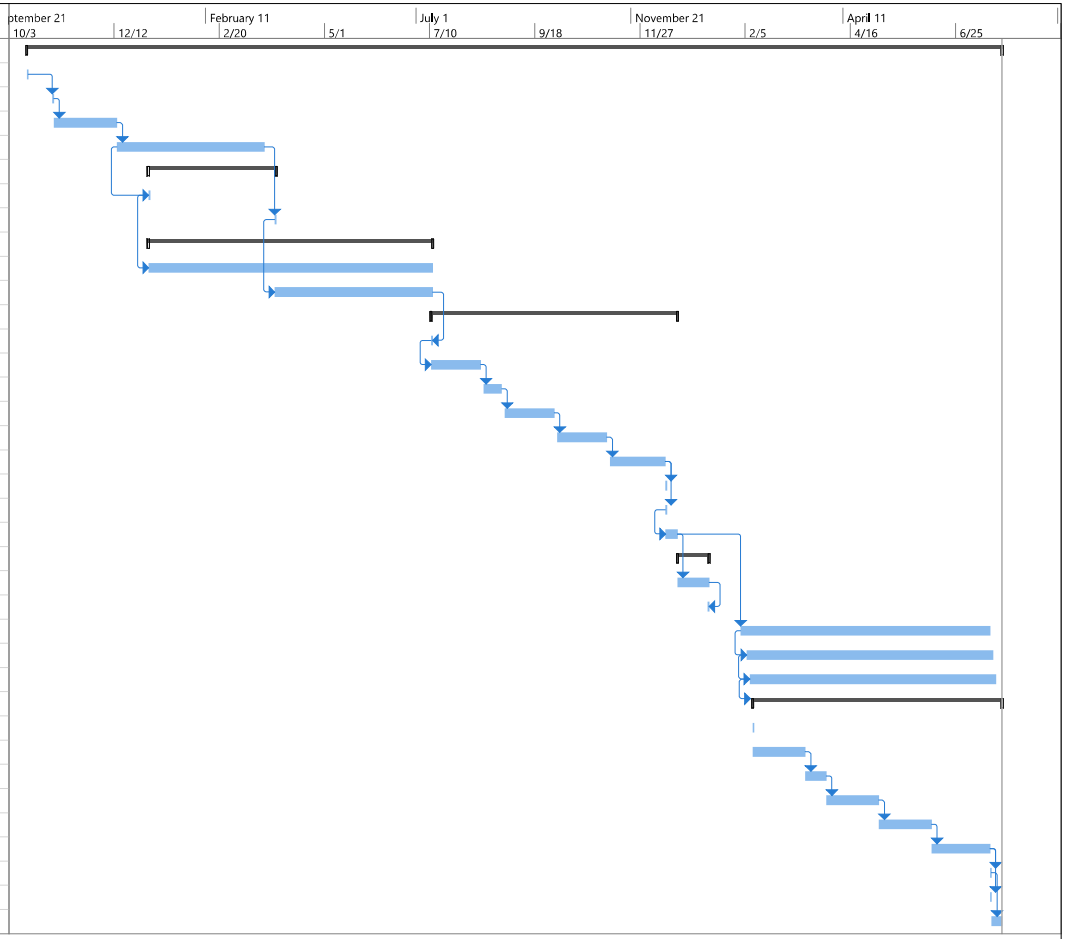
STANDARD BUS PRODUCTION SCHEDULE

Week 1	Frame assembly, Wheel well sheet metal
Week 2	Skin, Inside sheet aluminum, Front/rear fiberglass
Week 3	Compartment door, Electric component box, Insulation in roof, Undercoating in compartment and wheel well, Axles
Week 4	Chassis low voltage harness, ceiling low voltage harness, ABS low voltage harness, Dashboard low voltage harness, High voltage harness, Air tanks and electric components in rear compartment, Brake system, Steering system
Week 5	Cooling system, Batteries (both high voltage and low voltage), Brake/acceleration pedals & headlight foot control switch, Floor, Floor bondo and sanding, Vinyl Floor covering, Floor molding
Week 6	Painting
Week 7	Amerex system, A/C, Roof hatch, Roof slip resistant tape, Gutter, Exterior rearview mirror, Roof decorative fiberglass, Roof wires (for interior cameras), Bumpers, Bike rack, Ramp, Exterior lights, step lights, Destination signs, Defroster, Wiper
Week 8	Driver area fiberglass (dash fiberglass, side console fiberglass, front electric component fiberglass, steering column fiberglass), Electric control panel switches, Defroster pipe, Side wall trim (side wall panels, door pillar fiberglass, battery
Week 9	Ceiling trim (driver overhead fiberglass, front door fiberglass, windshield fiberglass, interior sign fiberglass, fron middle fiberglass), Middle ceiling panel, Interior cameras, PA system, GPS antenna, Air duct, Passenger seat
Week 10	Handrail, Driver seat, Sunshade, Interior rearview mirror, Triangle flare kit and coat hanger, Fire extinguisher, Front hatch, Labels
Week 11	Quality issue rework, Test line
Week 12	Road Test
Week 13	Customer Presentation

PROJECT SCHEDULE

BYD generated the following GANTT chart schedule for design, production, and delivery of all buses to PSTA. In this schedule, we have included milestones and specified contract deliverables for total vehicle delivery.

ID	Task Mode	Task Name	Duration	Start	Finish
1		**Build Schedule (Assuming 5 Buses)**	**463 days**	**Fri 10/15/21**	Tue 7/25/23
2		Contract Award	1 day	Fri 10/15/21	Fri 10/15/21
3		Project Kick-off / Pre-Production Meeting	1 day	Mon 11/1/21	Mon 11/1/21
4		Build Sheet Sign Off (Specs Confirmed)	30 days	Tue 11/2/21	Mon 12/13/21
5		Design	70 days	Tue 12/14/21	Mon 3/21/22
6		BOM Release	61 days	Tue 1/4/22	Tue 3/29/22
7		Initial BOM release	1 day	Tue 1/4/22	Tue 1/4/22
8		Final BOM Release	1 day	Tue 3/29/22	Tue 3/29/22
9		Procurement	135 days	Tue 1/4/22	Mon 7/11/22
10		Long Lead Time Material	135 days	Tue 1/4/22	Mon 7/11/22
11		All Material	75 days	Tue 3/29/22	Mon 7/11/22
12		Pilot Bus (First Vehicle) Delivery	118 days	Mon 7/11/22	Wed 12/21/22
13		Pilot Bus (First Vehicle) on Production Line	1 day	Mon 7/11/22	Mon 7/11/22
14		Welding	25 days	Mon 7/11/22	Fri 8/12/22
15		Painting	10 days	Mon 8/15/22	Fri 8/26/22
16		Chassis	25 days	Mon 8/29/22	Fri 9/30/22
17		Final Assembly	25 days	Mon 10/3/22	Fri 11/4/22
18		System Validation	27 days	Mon 11/7/22	Tue 12/13/22
19		Pilot Bus (First Vehicle) off Production Line	1 day	Wed 12/14/22	Wed 12/14/22
20		Pilot Bus (First Vehicle) through BYD's Quality Assurance Inspections	1 day	Wed 12/14/22	Wed 12/14/22
21		Pilot Bus (First Vehicle) Shipped to PSTA	6 days	Wed 12/14/22	Wed 12/21/22
22		Pilot Bus (First Vehicle) Acceptance	15 days	Thu 12/22/22	Wed 1/11/23
23		Post-Delivery Acceptance Test	15 days	Thu 12/22/22	Wed 1/11/23
24		Pilot Bus Accepted	1 day	Wed 1/11/23	Wed 1/11/23
25		2nd Bus Production & Delivery	118 days	Thu 2/2/23	Mon 7/17/23
26		3rd Bus Production & Delivery	118 days	Mon 2/6/23	Wed 7/19/23
27		4th Bus Production & Delivery	118 days	Wed 2/8/23	Fri 7/21/23
28		5th Bus (Last Bus) Production & Delivery	118 days	Fri 2/10/23	Tue 7/25/23
29		5th Bus (Last Vehicle) on Production Line	1 day	Fri 2/10/23	Fri 2/10/23
30		Welding	25 days	Fri 2/10/23	Thu 3/16/23
31		Painting	10 days	Fri 3/17/23	Thu 3/30/23
32		Chassis	25 days	Fri 3/31/23	Thu 5/4/23
33		Final Assembly	25 days	Fri 5/5/23	Thu 6/8/23
34		System Validation	27 days	Fri 6/9/23	Mon 7/17/23
35		5th Bus (Last Vehicle) off Production Line	1 day	Tue 7/18/23	Tue 7/18/23
36		5th Bus (First Vehicle) through BYD's Quality Assurance Inspections	1 day	Tue 7/18/23	Tue 7/18/23
37		5th Bus (Last Vehicle) Ship to PSTA	5 days	Wed 7/19/23	Tue 7/25/23



Project: PSTA Delivery Schedule
Date: Mon 9/13/21

Task
Split
Milestone
Summary
Project Summary
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
External Tasks
External Milestone
Deadline
Progress
Manual Progress

ON-GOING PROJECTS

AGENCY NAME	AGENCY LOCATION	NUMBER OF BUS REMAINING
Antelope Valley Transit Authority	Lancaster, CA	10
Anaheim Resort Transportation	Anaheim, CA	10
Capital Area Transit System (CATS)	Baton Rouge, LA	3
Fresno County Rural Transit Agency	Fresno, CA	12
LADOT	Los Angeles, CA	130
LA Metro	Los Angeles, CA	87
Link Transit	Wenatchee, WA	3
Long Beach Transit	Long beach, CA	14
Macon-Bibb County Transit Authority	Macon, GA	2
Martha's Vineyard Regional Transit Authority (VTA)	Edgartown, MA	1
San Francisco Municipal Transportation Agency	San Francisco, CA	2
Solano County Transit (SolTrans)	Vallejo, CA	1
Sonoma County Transit	Santa Rosa, CA	3
Bauer's Intelligent Transportation Services Inc	San Francisco, CA	10
Steamship Authority	Falmouth, MA	3
Santa Barbara County Association of Governments	Santa Barbara, CA	6

QUALITY ASSURANCE PROGRAM

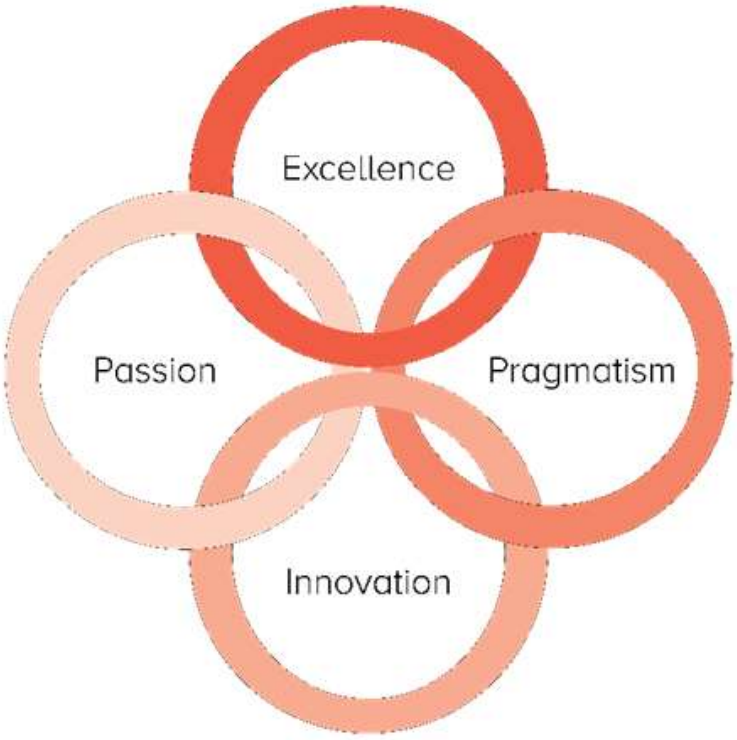
QUALITY ASSURANCE PROGRAM

We have included our Quality Assurance Program is included in Section 4 – Proprietary/Confidential Information.

MANAGEMENT PLAN

MANAGEMENT PLAN

Excellence. Passion. Innovation. Pragmatism.



These BYD Core Values guide our collaboration with clients and teammates, our vision and strategic plan, the way we do business, and who we want to be as professionals and as a firm.

PROJECT APPROACH

The overriding objective of each project is to deliver quality products that are built consistently, cost-effective, and in a timely manner. BYD's Customer Project Management (CPM) team is comprised a vast network of professionals each with a vested interest of designing, engineering, and manufacturing every Battery-Electric Bus in compliance with our customer's contracts from the moment the contract has been signed to final in-service delivery of the last bus.

Upon contract award, our dedicated Project Manager will begin working with our internal team to develop a plan of action to delivering on-time and on-budget. His primary responsibilities will be:

- Ensuring that each of your requirements and expectations as specified in the contract are fully understood, communicated, and delivered through the whole contract.
- Acting as the primary liaison between BYD and your project team after the contract Notice-of-Award until all buses are fully delivered and in full revenue service.
- Manage project goals and schedule milestones and provide key subject matter experts to project efforts to deliver quality.

ORGANIZATION CHART

BYD has assembled a highly qualified and experience team to manufacture a Battery-Electric bus to meet the PSTA's technical and project objectives. Our team includes key personnel with over 100 years of combined experience designing and manufacturing heavy-duty buses for North American Transit operations. Together our team is committed to producing quality buses for PSTA and will work seamlessly from start to finish.

John Hatch will be the Point-Of-Contact Representative for the PSTA. He will be responsible for contract and customer management for the duration of the project. He will be a liaison between the PSTA personnel and BYD project team members.

Ralph Serrano will be the Project Manager for the PSTA bus build. He will provide direct schedule, contract, vehicle compliance, technical, and project management for the build of the vehicle. He will be responsible for communicating any schedule conflicts or major issues to the PSTA directly. He will manage at team of engineers led by Chief Engineering, Jing Kui. He will also have direct discussions with the Supply Chain management team to ensure that all specific components, subsystems are ordered on time to avoid any delays to the schedule.

Patrick Duan will be the Project Executive for this project. Patrick will provide direct oversight for the project. He will ensure that BYD is properly staffed to complete the project on time.

PROJECT PLAN

A detailed five phase project plan is developed to identify the following key milestones in the process considering key dates that agreed upon in the contract.

PRE-PROJECT PHASE	PROJECT INITIATION/DESIGN PHASE	PRODUCTION/BUILD PHASE	INSPECTION/TEST & DELIVERY PHASE	AFTERSALES PHASE
• Review customer specifications to develop strategies to build a compliant bus. • Assign a specific Project Manager and Lead Engineer • Establish initial vehicle design. • Develop Preliminary Milestone Schedule	• Pre-Production Meeting to establish detailed schedule, task assignments, designs, and list of materials and parts. • Discussion of bus and charger design, creates Sales and Production Order • Develop full production project milestone schedule. • Create Bill of Materials (BOM) • Engineering Design freeze	• Procurement of materials • Bus Build • Charger Configuration	• First Article Inspection & Test • Pre-Delivery Inspection and Test (at BYD manufacturing facility) • Delivery and installation of charging infrastructure • Delivery of Vehicles to customer depot • Post-Delivery Inspection & Test (Customer Acceptance)	• Acceptance of Vehicles constitute transition of communication and collaboration responsibilities from the Bus Project Manager to Aftersales Department

SCHEDULE MANAGEMENT

BYD utilizes Project Management Tools of Wrike and Microsoft Project to generate a detailed GANTT Chart and assign tasks to maintain the schedule. By using these tools, it enables BYD to build a detailed schedule to monitor milestone, contract deliverables, identify critical problem areas.

COVID-19 EFFECT ON SCHEDULE MANAGEMENT

As the world begins to reopen from COVID-19 Pandemic, BYD understands there will be inherent difficulties in our supply chain line. Many companies will struggle to revamp up production. Understanding that this will be a key factor in maintaining our schedule of delivery, BYD will prepare a plan to address the possibilities of delays associated with that. Our Project Manager will provide the detailed plan during the Pre-Production Meeting.

MANAGEMENT OF SCHEDULE DELAYS

The Production Lead will schedule overtimes if they are unable to meet production schedule. In the past we have also established a second shift to address critical projects and meet production deadlines. Along with additional shifts, BYD is continuously monitoring production KPI and finding new ways to reduce production time. Before the start of on a new project, the project manager and the production team have a pre-production meeting to address all the issues including material delay/shortage; this ensures that we can minimize production delay. Any delay that it is anticipated to due to material long lead times or for any other reason is communicated verbally and in writing to the PSTA by the Project Manager in charge of the project. At time this will even be escalated to our executive team.

RISK MANAGEMENT

The overall aim of risk and opportunity management within BYD Coach & Bus LLC is to ensure that organizational capabilities and resources are employed in an efficient and effective manner to take advantage of opportunities and to mitigate risks.

Top management is responsible for incorporating risk-based thinking into our organization's culture. This includes the establishment of risk management policies and targets to ensure effective implementation of risk and opportunity management principles and activities by:

- Providing sufficient resources to carry out risk and opportunity management activities.
- Assigning responsibilities and authorities for risk and opportunity management activities
- Reviewing information and results from audits and risk and opportunity management activities

The scope of BYD Coach & Bus LLC risk and opportunity management process includes the assessment of

the internal and external issues, and the assessment of the needs and expectations of any interested parties. Risk and opportunity management is undertaken as part of BYD Coach & Bus LLC day-to-day operations and is captured at the following hierarchy:

- Strategic Level
- Program Level
- Departmental Level
- Process Level

Establishing such a hierarchy for capturing risk and opportunity ensures that each is managed at the most appropriate level within our organization.

BYD Coach & Bus LLC has classified its 'risk appetite' as the amount of risk that we are willing to accept in pursuit of an opportunity or the avoidance of risk where each pertains to product and/or system conformity, and which reflect the following considerations:

- Risk management philosophy per product or process
- Capacity to take on or mitigate risk.
- Our objectives, business plans and respective customer demands
- Evolving industry and market conditions
- Tolerance for failures

COMMUNICATION PLAN

Our approach to project management is developed on principles of strong communication that focus on responding to each of our customer's needs and relaying information about our projection efforts. Communication and coordination with our customers are pillars to successfully delivering on projects. To BYD, there is no substitute for maintaining clear, open lines of communication with our customers to build strong relationships. We dedicate our team to building and maintaining these relationships throughout the life cycle of the contract.

In addition to having face-to-face meetings to build these strong communications, BYD will utilize technological tools such as Zoom to communicate project schedule and key project milestone deliverables. By leveraging these tools, BYD will be able to achieve seamless coordination and collaboration, while mitigating potential project management risks.

- BYD's Communication Plan will include:
- Primary and backup points of contact
- Key personnel contact information
- Weekly/Monthly meetings
- Meeting Agendas and dates
- Review of customer specification in a formal kick-off meeting
- Specific email protocols between BYD and the customer personnel
- Document Management System for deliverables

CONFIGURATION MANAGEMENT PLAN

BYD's Configuration Management Plan (CMP) has been established to ensure that designs are traceable to requirements, changes are controlled and documented, and there is consistency between the product and its supporting documentation. The CMP identifies and describes the overall procedures for configuration management of the vehicles throughout the transit life cycle of the vehicles. Scope begins at Notice of Proceed (NTP) and ends at the completion of general warranty. The CMP is closely associated with technical data management and interface management. The CMP will further outline the methodologies through with BYD will establish and document any changes to the baseline design.

The CMP describes procedures for the following functions:

- **Configuration Identification:** Identify all parts requiring serial numbering; specify procedures for

serialization, and record serial numbers for all required items per vehicle specifying the revision level of each part for configuration control of hardware and software.

- **Change Control:** Procedures will document and control any changes to hardware and software configuration that may be initiated by suppliers, BYD, contract change orders (Modifications), engineering changes, and field modifications.

The configuration control process ensures that submittal of deliverable, such as drawings, (especially final as-built drawings), specifications, and manuals accurately record the latest revisions levels for all equipment.

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 21, 2021

Build Your Dreams®

SUBMITTED BY:
BYD Coach & Bus LLC.
1800 South Figueroa Street
Los Angeles, CA 90015

BYD CONTACT PERSONNEL:
Patrick Duan, Senior VP of Operations
P: 213.880.8597 E. patrick.duan@byd.com

John Hatch, Southeast Regional Sales Manager,
P: 407.729.0406 E: john.hatch@byd.com

Maria Mendoza, Director of Bids and Grants
P: 213.356.3660 E: maria.mendoza1@byd.com

SUBMITTED TO:
Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 23, 2021

SECTION 2 — PRICE PROPOSAL

SUBMITTED BY:
BYD Coach & Bus LLC.
1800 South Figueroa Street
Los Angeles, CA 90015

BYD CONTACT PERSONNEL:
Patrick Duan, Senior VP of Operations
P: 213.880.8597 E. patrick.duan@byd.com

John Hatch, Southeast Regional Sales Manager,
P: 407.729.0406 E: john.hatch@byd.com

Maria Mendoza, Director of Bids and Grants
P: 213.356.3660 E: maria.mendoza1@byd.com

SUBMITTED TO:
Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

THIS PROPOSAL INCLUDES INFORMATION THAT SHALL NOT BE DISCLOSED OUTSIDE OF PINELLAS SUNCOAST TRANSIT AUTHORITY. AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS PROPOSAL. IF, HOWEVER, A CONTRACT IS AWARDED TO THIS BYD AS A RESULT OF, OR IN CONNECTION WITH, THE SUBMISSION OF THIS INFORMATION, PINELLAS SUNCOAST TRANSIT AUTHORITY SHALL HAVE THE RIGHT TO DUPLICATE, USE, OR DISCLOSE THE INFORMATION TO THE EXTENT PROVIDED IN THE RESULTING CONTRACT. THIS RESTRICTION DOES NOT LIMIT PINELLAS SUNCOAST TRANSIT AUTHORITY'S RIGHT TO USE INFORMATION CONTAINED IN THIS INFORMATION IF IT IS OBTAINED FROM ANOTHER SOURCE WITHOUT RESTRICTION. THE INFORMATION SUBJECT TO THIS RESTRICTION IS CONTAINED ON ALL PAGES THAT FOLLOW.

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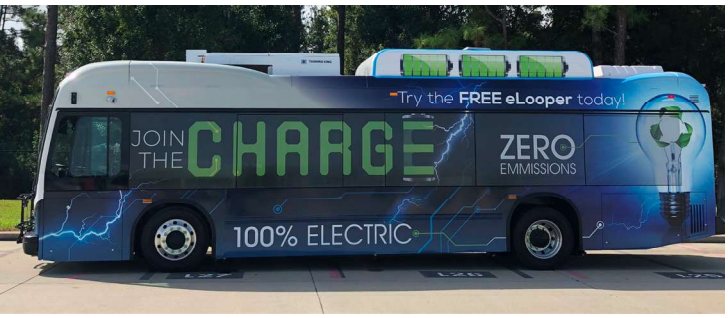

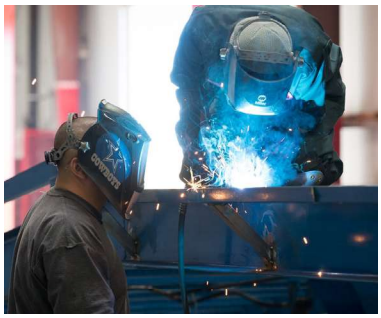

LETTER OF TRANSMITTAL

BYD Coach & Bus LLC
1800 South Figueroa Street
Los Angeles, CA 90015

213.748.3980
213.373.9801 fax
www.byd.com

September 20, 2021

Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

RE: RFP No. 21-980369 – Florida Electric Transit Buses and Charging and Associated Equipment

Dear Mr. Burns,

BYD Coach & Bus LLC. (BYD) is pleased to submit the enclosed proposal in response to Pinellas Suncoast Transit Authority's (PSTA) Request for Proposals (RFP) No. 21-980369 – Florida Electric Transit Buses and Charging and Associated Equipment. BYD stands for "**Build Your Dreams**," and we are a proud American manufacturer and innovator producing 100% Battery Electric Buses. We are dedicated to reducing overall emissions and environmental pollution.

We accept the RFP terms without exception unless specifically indicated within our technical proposal. We submit this letter in response to your RFP as a "Letter of Transmittal" and include the following information for your convenience:

1. Contact Information	BYD Coach & Bus LLC 1800 South Figueroa Street Los Angeles, CA 90015 bids.na@byd.com
2. Authorized Contact Person	Patrick Duan, Senior Vice President of Operations Phone: 213.880.8597 Email: patrick.duan@byd.com
3. Point of Contact	John Hatch, Southeast Regional Sales Manager Phone: 407.729.0406 Email: john.hatch@byd.com

This letter of transmittal is signed by Patrick Duan, Senior Vice President of Operations, who is authorized to bind BYD to terms of the proposal. We are confident that you will find our response to your RFP both thorough and fully responsive. We look forward to your bid opening and favorable response.

Sincerely,

Patrick Duan
Senior Vice President of Operations

PRICING SCHEDULE

PSTA PRICING SCHEDULE

PINELLAS SUNCOAST TRANSIT AUTHORITY (PSTA) RFP 21-98369

SCHEDULE

CAUTION: A false statement in any offer submitted to PSTA may be a criminal OFFENSE.

NOTE: For Invitations for Bids the terms "Offer" and "Offeror" shall mean "Bid" and "Bidder", respectively; and for Request for Proposals the terms "Bid" and "Bidder" shall mean "Offer" and "Offeror", respectively, in this solicitation and any associated exhibits.

The rates include all costs that the offeror(s) intends to recover, such as, but not limited to: supervision, labor, equipment, materials, vehicle licensing, vehicle title, pick-up, financing, carrying charges, and all other such charges to accommodate the services and requirements. No price adjustments will be made, unless specifically provided for by an additional provision included in this contract.

PRICING

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
1	Cost of (1) 29FT/30FT, low floor, all electric bus, per the specifications	**BASE BUS**	1	$ 630,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
2	Cost of (1) 35FT, low floor, all electric bus, per the specifications	**BASE BUS**	1	$ 750,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
3	Cost of (1) 40FT, low floor, all electric bus, per the specifications	**BASE BUS**	1	$ 730,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
4	Cost of (1) 45FT, all electric bus, per the specifications	**BASE BUS**	1	$ 950,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
5	Cost of (1) 60FT (articulated), low floor, all electric bus, per the specifications	**BASE BUS**	1	$ 1,200,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
6	Cost of (1) Depot Charger	BYD: 80kW AC Charger	1	$ 20,000.00	$ 20,000.00	$ 20,000.00	PPI Pricing*	PPI Pricing*
7	Cost of (1) Depot Charger	Heliox: FAST DC/OC 175kW UL Charger Equipmen Only (Pillar, SAT, and Installation Excluded)	1	$ 65,042.85	Quote	Quote	Quote	Quote
8	Cost of (1) Depot Charger	ABB: 1 x HVC-150C – 150kW UL BAA Cabinets (480 VAC Input) 1 x Depot Charge Boxes UL BAA 7m dispenser Equipmen Only	1	$ 118,125.70	Quote	Quote	Quote	Quote
9	Cost of (1) Depot Charger	Siemens: SICHARGE UC200 (150kW) with one remote dispenser – CCS1 Equipmen Only	1	$ 86,250.00	Quote	Quote	Quote	Quote
10	Cost of (1) On Route Charger		1					
11	Cost of (1) On Route Charger	WAVE: 250kW Primary In Route Charging Includes a single pad capable of dispensing 250kW directly to the battery and associated all in-ground equipment.	1	$ 264,000.00	Quote	Quote	Quote	Quote
12	Cost of (1) On Route Charger	WAVE: 250kW Secondary Includes the 250kW receiver unit attached to the underside of the vehicle, all vehicle-side equipment on Wave-ready vehicle.	1	$ 96,400.00	Quote	Quote	Quote	Quote
13	Cost of (1) On Route Charger	Momentum Dynamics: MD WPT5 Wireless 300kW Primary System Equipmen Only	1	$ 220,000.00	Quote	Quote	Quote	Quote
14	Cost of (1) On Route Charger	Momentum Dynamics: MD WPT5 Wireless 300kW Vehicle System Equipmen Only	1	$ 49,200.00	Quote	Quote	Quote	Quote
15	ADVERTISING FRAMES	None	1	Standard				
16	ADVERTISING FRAMES	Advertising Frame - Interior 22" X 21",RH Load, Open Back, Clear Aluminum Finish	1	$ 267.32	Quote	Quote	Quote	Quote
17	ADVERTISING FRAMES	(1) Information Board (#15-55401-000)	1	$ 174.10	Quote	Quote	Quote	Quote
18	ADVERTISING FRAMES		1					
19	ADVERTISING FRAMES		1					
20	ADVERTISING FRAMES		1					
21	AIR SYSTEM	Bendix AD9 Air Dryer	1	N/A				
22	AIR SYSTEM	Shop Air Connection (Milton S790)	1	$ 91.00	Quote	Quote	Quote	Quote

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
23	AIR SYSTEM	Kingston Auto Drain Valve at Ping Tanks	1	$ 39.00	Quote	Quote	Quote	Quote
24	AIR SYSTEM	Bendix ADIP , Heated, Air Dryer	1	N/A				
25	AIR SYSTEM	Bendix Puraguard Air / Oil Separator	1	N/A				
26	AIR SYSTEM	Chicago Rawhide Dual Turbo 2000 Air Dryer	1	N/A				
27	AIR SYSTEM	Graham White Sludge Braker QBA15 Air Dryer	1	N/A				
28	AIR SYSTEM	Graham White Sludge Braker QBA60 Air Dryer	1	N/A				
29	AIR SYSTEM	Haldex Consep Moisture Ejector, Heated, at Air Dryer	1	N/A				
30	AIR SYSTEM	SKF, HCT 2000 Duraguard, 24V Heated, Filtration Plus Air Dryer	1	N/A				
31	AIR SYSTEM	SKF, HCT_2000 Duraguard Air Dryer	1	N/A				
32	AIR SYSTEM	Wabco SS 1800, Heated, Air Dryer	1	N/A				
33	AIR SYSTEM	Shop Air Connection (Milton 770)	1	$ 91.00	Quote	Quote	Quote	Quote
34	AIR SYSTEM	Shop Air Connection (Milton 727)	1	$ 39.00	Quote	Quote	Quote	Quote
35	AIR SYSTEM	Bendix ADIS Air Dryer	1	Standard				
36	AIR SYSTEM		1					
37	AIR SYSTEM		1					
38	AIR SYSTEM		1					
39	AIR SYSTEM		1					
40	AIR SYSTEM		1					
41	AIR SYSTEM		1					
42	AUTOMATIC PASSENGER COUNTER	UTA APC Sensors, Cabling, CPU Only (Integrated w/ ITS)	1	$ 7,981.49	Quote	Quote	Quote	Quote
43	AUTOMATIC PASSENGER COUNTER	UTA Automatic Passenger Counter System with GPS, WLAN Capabilities	1	$ 7,190.00	Quote	Quote	Quote	Quote
44	AUTOMATIC PASSENGER COUNTER	UTA Automatic Passenger Counter System with GPS, WLAN Capabilities (without APC software & Wi-Fi data transfer	1	$ 8,514.40	Quote	Quote	Quote	Quote
45	AUTOMATIC PASSENGER COUNTER	Clever Devices CleverCount System	1	$ 8,330.60	Quote	Quote	Quote	Quote
46	AUTOMATIC PASSENGER COUNTER		1					
47	AUTOMATIC PASSENGER COUNTER		1					
48	AXLES & SEALS	Stud Piloted Wheels and Axles w/ Oil Seals	1	N/A				
49	AXLES & SEALS	Synthetic 75W90 Gear Oil	1	N/A				
50	AXLES & SEALS	Hub Piloted Wheels and Axles w/ Grease Seals	1	Standard				
51	AXLES & SEALS	Hub Piloted Wheels, Axles with Oil Seals	1	Standard				
52	AXLES & SEALS	Stud Piloted Wheels and Axles w/ Grease Seals	1	N/A				
53	AXLES & SEALS	Rear Axle Oil Drain Plug--Magnetic Internal Hex Head Plug	1	Standard				
54	AXLES & SEALS	BYD Recommend Shell SAE 80W-90 GL-5 1QT	1	$ 14.30	Quote	Quote	Quote	Quote
55	AXLES & SEALS	BYD Recommend FUCHS 80W-90 GL-5 1L	1	$ 16.90	Quote	Quote	Quote	Quote
56	AXLES & SEALS	BYD Recommend Total SAE 75W-90 GL-5 1L	1	$ 12.00	Quote	Quote	Quote	Quote
57	BATTERIES	(2) DEKA 8D Side or Top Post Connections	1	$ 31.20	Quote	Quote	Quote	Quote
58	BATTERIES	Anderson 350 Jump Start Connector (Front & Rear)	1	$ 52.00	Quote	Quote	Quote	Quote
59	BATTERIES	Group 31 Batteries	1	Standard				
60	BATTERIES	Anderson 350 Jump Start Connector (Each)	1	$ 26.00	Quote	Quote	Quote	Quote
61	BATTERIES	Anderson 350 Jump Start Delete	1	Standard				
62	BATTERIES		1					
63	BATTERIES		1					
64	BATTERIES		1					
65	BIKE RACKS	Sportworks DL2, 2-Position, Stainless Steel	1	$ 1,193.97				
66	BIKE RACKS	Bike Rack Deployed Indicator Lamp on Driver's Dash	1	$ 35.00	$ 35.00	Quote	Quote	Quote
67	BIKE RACKS	Sportworks APEX 2, 2-Position, Stainless Steel	1	$ 1,190.01	$ 1,190.01	Quote	Quote	Quote
68	BIKE RACKS	Sportworks APEX 2, 2-Position, Powder Coated	1	$ 1,170.21	$ 1,170.21	Quote	Quote	Quote
69	BIKE RACKS	Sportworks DL2, 2-Position, Powder Coated	1	$ 872.22	$ 872.22	Quote	Quote	Quote
70	BIKE RACKS	Sportworks APEX3, 3-Position, Stainless Steel	1	$ 1,503.84	$ 1,503.84	Quote	Quote	Quote

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
71	BIKE RACKS	Sportworks APEX 3, 3-Position, Powder Coated	1	$ 1,407.81	$ 1,407.81	Quote	Quote	Quote
72	BIKE RACKS	Sportworks Trilogy (DL3), 3-Position, Stainless Steel	1	$ 1,935.48	$ 1,935.48	Quote	Quote	Quote
73	BIKE RACKS	Sportworks Trilogy (DL3), 3-Position, Powder Coated	1	$ 1,419.69	$ 1,419.69	Quote	Quote	Quote
74	BIKE RACKS	Sportworks Pivot Plate Only	1	$ 230.04	Quote	Quote	Quote	Quote
75	BIKE RACKS	Sportworks Mounting Brackets Only	1	$ 131.76	Quote	Quote	Quote	Quote
76	BIKE RACKS	Byk-Rak, 2-Position, Stainless Steel	1	$ 949.32	Quote	Quote	Quote	Quote
77	BIKE RACKS	Byk-Rak, 2-Position, Powder Coated	1	$ 624.24	Quote	Quote	Quote	Quote
78	BIKE RACKS	Byk-Rak, 3-Position, Stainless Steel	1	$ 1,208.52	Quote	Quote	Quote	Quote
79	BIKE RACKS	Byk-Rak, 3-Position, Powder Coated	1	$ 1,208.52	Quote	Quote	Quote	Quote
80	BIKE RACKS	Byk-Rak Pivot Plate Only	1	$ 230.04	Quote	Quote	Quote	Quote
81	BIKE RACKS	Byk-Rak-Mounting Brackets Only	1	$ 131.76	Quote	Quote	Quote	Quote
82	BIKE RACKS		1					
83	BIKE RACKS	Notes: all bike racks need to be purchased with pivot plate and brackets	1					
84	BIKE RACKS		1					
85	BIKE RACKS		1					
86	BIKE RACKS		1					
87	BIKE RACKS		1					
88	BIKE RACKS		1					
89	BIKE RACKS		1					
90	BRAKES	MGM E-Stroke Brake Wear Monitoring System	1	N/A				
91	BRAKES	Four Wheel Disc Brakes with ABS	1	Standard				
92	BRAKES		1					
93	BRAKES		1					
94	COMMUNICATIONS SYSTEM	DC Power Filter for Radio Wiring	1	Quote				
95	COMMUNICATIONS SYSTEM	Power Circuit (Route to RH Dash & Electrical Equipment Box) Roof Mount RF/GPS/Cellular Antenna	1	Quote				
96	COMMUNICATIONS SYSTEM	Motorola APX 4500	1	$ 1,162.50	Quote	Quote	Quote	Quote
97	COMMUNICATIONS SYSTEM	Motorola APX 6500	1	$ 1,266.00	Quote	Quote	Quote	Quote
98	COMMUNICATIONS SYSTEM	Harris XG-25M	1	$ 1,243.00	Quote	Quote	Quote	Quote
99	COMMUNICATIONS SYSTEM	Antenna Specialist ASP 572 Antenna	1	$ 110.96	Quote	Quote	Quote	Quote
100	COMMUNICATIONS SYSTEM	Antenna Specialist ASP 931 Antenna	1	$ 89.28	Quote	Quote	Quote	Quote
101	COMMUNICATIONS SYSTEM	Antenna Specialist ASP 930T Antenna with RG58 coax cable and TNC connector	1	$ 71.50	Quote	Quote	Quote	Quote
102	COMMUNICATIONS SYSTEM	GPS Antenna (Trimble 502 Model 18334)	1	$ 71.50	Quote	Quote	Quote	Quote
103	COMMUNICATIONS SYSTEM		1					
104	COMMUNICATIONS SYSTEM		1					
105	COMMUNICATIONS SYSTEM		1					
106	COMMUNICATIONS SYSTEM		1					
107	COMMUNICATIONS SYSTEM		1					
108	DESTINATION SIGNS	Hanover 100% White LED Sign (17 x 160)--Front ,Side, Rear	1	$ 2,308.50	Quote	Quote	Quote	Quote
109	DESTINATION SIGNS	Hanover 100% Amber LED Sign (17 x 160)--Front ,Side, Rear	1	$ 1,808.00	Quote	Quote	Quote	Quote
110	DESTINATION SIGNS	Hanover 100% Full Color LED Sign (17 x 160)--Front ,Side, Rear	1	$ 4,767.00	Quote	Quote	Quote	Quote
111	DESTINATION SIGNS	Hanover--Add Front Run Sign--White LED	1	$ 2,365.00	Quote	Quote	Quote	Quote
112	DESTINATION SIGNS	Hanover--Add Front Run Sign--Amber LED	1	$ 2,046.00	Quote	Quote	Quote	Quote
113	DESTINATION SIGNS	Hanover--Add Front Run Sign--Color LED	1	$ 3,245.00	Quote	Quote	Quote	Quote
114	DESTINATION SIGNS	Hanover--Delete Rear Sign	1					
115	DESTINATION SIGNS	Hanover Program Software	1	$ 5,500.00	Quote	Quote	Quote	Quote
116	DESTINATION SIGNS	TwinVision Smart Series 3 100% Silver LED Sign (16 X 160)-- Front, Side, and Rear	1	$ 2,308.50	Quote	Quote	Quote	Quote
117	DESTINATION SIGNS	TwinVision Smart Series 3 100% Amber LED Sign (16 x 160)--Front, Side, and Rear	1	$ 2,572.50	Quote	Quote	Quote	Quote
118	DESTINATION SIGNS	Luminator Titan Silver Series LED Sign (24 X 200)--Front, Side, and Rear	1	$ 2,047.80	Quote	Quote	Quote	Quote

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
119	DESTINATION SIGNS	Luminator Titan Amber Series Sign (24 x 200)--Front, Side, and Rear	1	$ 2,030.20	Quote	Quote	Quote	Quote
120	DESTINATION SIGNS	Luminator GEN 4 Horizon 100% Silver LED Sign (16 x 160)--Front, Side , and Rear	1	$ 3,312.80	Quote	Quote	Quote	Quote
121	DESTINATION SIGNS	Luminator GEN 4 Horizon 100% Amber LED Sign (16x 160)--Front, Side , and Rear	1	$ 1,370.20	Quote	Quote	Quote	Quote
122	DESTINATION SIGNS	Luminator Spectrum 100% Full Color LED GEN IV Front Sign (16 x 112)	1	$ 5,500.00	Quote	Quote	Quote	Quote
123	DESTINATION SIGNS	Luminator/Twinvision--Add Front Run Sign--Amber LED	1	$ 1,082.40	Quote	Quote	Quote	Quote
124	DESTINATION SIGNS	Luminator/Twinvision--Add Front Run Sign--Silver LED	1	$ 1,375.00	Quote	Quote	Quote	Quote
125	DESTINATION SIGNS	Luminator/Twinvision--Add Front Run Sign--Color LED	1	$ 2,200.00	Quote	Quote	Quote	Quote
126	DESTINATION SIGNS	Luminator RearView Camera Integraded into Rear LED Sign	1	$ 104.50	Quote	Quote	Quote	Quote
127	DESTINATION SIGNS	Luminator Rearview Camera without Rear LED Sign	1	$ 440.00	Quote	Quote	Quote	Quote
128	DESTINATION SIGNS	Luminator--Delete Rear Sign	1	$ 880.00	Quote	Quote	Quote	Quote
129	DESTINATION SIGNS	I/O Controls Standard Amber Front, Side, and Rear	1	Standard				
130	DESTINATION SIGNS		1					
131	DESTINATION SIGNS		1					
132	DESTINATION SIGNS		1					
133	DESTINATION SIGNS		1					
134	DESTINATION SIGNS		1					
135	DESTINATION SIGNS		1					
136	DESTINATION SIGNS		1					
137	DESTINATION SIGNS		1					
138	DESTINATION SIGN SOFTWARE	Luminator Program Software	1	$ 1,214.40	Quote	Quote	Quote	Quote
139	DESTINATION SIGN SOFTWARE	TwinVision Program Software	1	$ 802.70	Quote	Quote	Quote	Quote
140	DESTINATION SIGN SOFTWARE	Luminator Destination Sign Wireless Programming	1	$ 3,795.00	Quote	Quote	Quote	Quote
141	DESTINATION SIGN SOFTWARE	I/O Controls Standard Software	1	Standard				
142	DESTINATION SIGN SOFTWARE		1					
143	DESTINATION SIGN SOFTWARE		1					
144	DOOR SYSTEM--FRONT	OEM Standard Air Open/Spring Close Front Door with Full Driver Control--31.75" Minimum Doorway Clear Width	1	N/A				
145	DOOR SYSTEM--FRONT	BYD Eletric Slide Glide Front Door	1	Standard				
146	DOOR SYSTEM--FRONT		1					
147	DOOR SYSTEM--FRONT		1					
148	DOOR SYSTEM--REAR	OEM Standard Air Open/Spring Close Rear Door with Full Driver Control--31.75" Minimum Doorway Clear Width	1	N/A				
149	DOOR SYSTEM--REAR	Add Touch Bars (Air Open / Spring Close) at Rear Door with Driver Override	1	$ 205.20	Quote	Quote	Quote	Quote
150	DOOR SYSTEM--REAR	Add Touch Tape at Rear Doors	1	$ 352.20	Quote	Quote	Quote	Quote
151	DOOR SYSTEM--REAR	BYD Eletric Slide Glide Rear Door	1	Standard				
152	DOOR SYSTEM--REAR		1					
153	DOOR SYSTEM--REAR		1					
154	DOOR SYSTEM	Add Exterior Air Release (Front Door Control Valve)	1	N/A				
155	DOOR SYSTEM	Add Vapor Class 5 Position Analog Controller	1	$ 1,154.40	Quote	Quote	Quote	Quote
156	DOOR SYSTEM	Add Push Button Door Controls	1	$ 690.00	Quote	Quote	Quote	Quote
157	DOOR SYSTEM	Add--Vapor Activair Differential Engine for Slide-Glide Doors	1	$ 438.46	Quote	Quote	Quote	Quote
158	DOOR SYSTEM	Add--Vapor CLASS Acoustic (Photo Sensor)	1	$ 498.00	Quote	Quote	Quote	Quote
159	DOOR SYSTEM	Add--Vapor Digital Door Control - DDC	1	$ 690.00	Quote	Quote	Quote	Quote
160	DOOR SYSTEM	Add--Vapor Electric Transit Operator - ETO	1	$ 576.12	Quote	Quote	Quote	Quote
161	DOOR SYSTEM	Add--Vapor Light Touch Bars	1	$ 403.66	Quote	Quote	Quote	Quote
162	DOOR SYSTEM	Add--Vapor Optical Pressure Switch - OPS	1	$ 374.00	Quote	Quote	Quote	Quote
163	DOOR SYSTEM		1					

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
164	DOOR SYSTEM		1					
165	DOOR SYSTEM		1					
166	DOOR SYSTEM		1					
167	DRIVER BARRIER	None	1	Standard				
168	DRIVER BARRIER	Drivers Barrier Storage Box	1	Quote				
169	DRIVER BARRIER	Driver's Security Enclosure	1	Quote				
170	DRIVER BARRIER	Flat Melamine, Two Piece	1	Quote				
171	DRIVER BARRIER	Plexiglass Drivers Security Enclosure Door	1	Quote				
172	DRIVER BARRIER	Wrap Around Fiberglass Drivers Barrier	1	Quote				
173	DRIVER BARRIER	Wraparound fiberglass, without schedule holders, with drivers barrier grap handle	1	Quote				
174	DRIVER BARRIER		1					
175	DRIVER BARRIER	Notes: vendor price varies on quantity	1					
176	DRIVER BARRIER		1					
177	DRIVER BARRIER		1					
178	DRIVER CONTROLS	Williams Controls 41 Degree Throttle and Brake Pedal (Non-Adjustable)	1	Quote				
179	DRIVER CONTROLS	Kongsberg Adjustable Throttle and Brake Pedal	1	N/A				
180	DRIVER CONTROLS	Teleflex Adjustable Throttle and Brake Pedal	1	N/A				
181	DRIVER CONTROLS	12 V Cigarette Light Adaptor for PC auxilary power-Drivers area	1	$ 20.80	Quote	Quote	Quote	Quote
182	DRIVER CONTROLS		1					
183	DRIVER CONTROLS	BYD Non-adjustable 36 Degree Throttle and Brake Pedal	1	Standard				
184	DRIVER HEATERS	Dash Fan	1	$ 67.60	Quote	Quote	Quote	Quote
185	DRIVER HEATERS		1					
186	DRIVER HEATERS		1					
187	DRIVERS SEAT	USSC G2A Evolution, with Fabric, with 3-Point Belt (Lap & Shoulder)	1	$ 1,362.10	Quote	Quote	Quote	Quote
188	DRIVERS SEAT	Recaro Ergo Metro, with Fabric, with 2-Point Belt (Lap)	1	$ -				
189	DRIVERS SEAT	Recaro Ergo Metro, with Fabric, with 3-Point Belts (Lap & Shoulder)	1	Standard				
190	DRIVERS SEAT	Add Vinyl Upholstery to Recaro Ergo Metro	1	$ -				
191	DRIVERS SEAT	Add Orange Shoulder Belt to Recaro Ergo Metro	1	$ 132.00	Quote	Quote	Quote	Quote
192	DRIVERS SEAT	Add Adjustable D-Ring to Recaro Ergo Metro	1	$ 220.00	Quote	Quote	Quote	Quote
193	DRIVERS SEAT	Add Headrest to Recaro Ergo Metro	1	$ -				
194	DRIVERS SEAT	Add Drivers Seat Vacancy Alarm to Recaro Ergo Metro	1	$ 117.70	Quote	Quote	Quote	Quote
195	DRIVERS SEAT	Add Seat Belt Alarm to Recaro Ergo Metro	1	$ 38.50	Quote	Quote	Quote	Quote
196	DRIVERS SEAT	USSC 9100 ALX, with Fabric, with 2-Point Belt (Lap)	1	$ 193.90	Quote	Quote	Quote	Quote
197	DRIVERS SEAT	USSC 9100 ALX, with Fabric, with 3-Point Belt (Lap & Shoulder)	1	$ 405.10	Quote	Quote	Quote	Quote
198	DRIVERS SEAT	USSC G2 Evolution, with Fabric, with 2-Point Belt (Lap)	1	$ 1,175.10	Quote	Quote	Quote	Quote
199	DRIVERS SEAT	USSC G2 Evolution, with Fabric, with 3-Point Belt (Lap & Shoulder)	1	$ 1,362.10	Quote	Quote	Quote	Quote
200	DRIVERS SEAT	USSC G2A Evolution, with Fabric, with 2-Point Belt (Lap)	1	$ 1,175.10	Quote	Quote	Quote	Quote
201	DRIVERS SEAT	USSC Q Series, with Fabric, with 2-Point Belt (Lap)	1	$ 1,111.30	Quote	Quote	Quote	Quote
202	DRIVERS SEAT	USSC Q Series, with Fabric, with 3-Point Belt (Lap & Shoulder)	1	$ 1,220.20	Quote	Quote	Quote	Quote
203	DRIVERS SEAT	Add Vinyl Upholstery to USSC Seat	1	$ -				
204	DRIVERS SEAT	Add Orange Shoulder Belt to USSC Seat	1	$ -				
205	DRIVERS SEAT	Add Adustable D-Ring to USSC Seat	1	Quote				
206	DRIVERS SEAT	Add Headrest to USSC Seat	1	$ -				
207	DRIVERS SEAT	Add Drivers Seat Vacancy Alarm to USSC Seat	1	$ 91.00	Quote	Quote	Quote	Quote

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
208	DRIVERS SEAT	Add Seat Belt Alarm to USSC Seat	1	$ 58.50	Quote	Quote	Quote	Quote
209	DRIVERS SEAT		1					
210	DRIVERS SEAT	Add Adustable D-Ring to USSC ALX Q Series Seat	1	$ 210.00	Quote	Quote	Quote	Quote
211	DRIVERS SEAT	Add Adustable D-Ring to USSC G2A Seat	1	$ 210.00	Quote	Quote	Quote	Quote
212	DRIVERS SEAT		1					
213	DRIVERS SEAT		1					
214	DRIVERS SEAT		1					
215	DRIVERS SEAT		1					
216	DRIVERS SEAT		1					
217	DRIVERS SEAT		1					
218	DRIVERS SEAT		1					
219	ELECTRICAL EQUIPMENT CABINET	44"H x 22.5"W x 20"D, 1-Door	1	Quote				
220	ELECTRICAL EQUIPMENT CABINET	33"H x 20"D x 22.5"W, 2-Doors	1	Quote				
221	ELECTRICAL EQUIPMENT CABINET	33"H x 20"D x 22.5"W, 1-Door	1	Quote				
222	ELECTRICAL EQUIPMENT CABINET	33"H x 20"D x 22.5"W, 1-Door, Louvered Back Panel	1	Quote				
223	ELECTRICAL EQUIPMENT CABINET	8.25"H x 20"W x 13"D, 1-Door, Curbside Wheelhousing Storage Box	1	Quote				
224	ELECTRICAL EQUIPMENT CABINET	Add 5/16" Square Key Lock--Each	1	Quote				
225	ELECTRICAL EQUIPMENT CABINET	Add Exhaust Ventilation Fan--Each	1	Quote				
226	ELECTRICAL EQUIPMENT CABINET	Add Standard Key Lock--Each	1	Quote				
227	ELECTRICAL EQUIPMENT CABINET	BYD 50"H X 41'W' X 26" D	1	Standard				
228	ELECTRICAL EQUIPMENT CABINET		1					
229	ELECTRICAL EQUIPMENT CABINET		1					
230	ELECTRICAL EQUIPMENT CABINET		1					
231	EXTERIOR LIGHTS	4" Diameter LED Tail Lights--Turn, Tail, Stop, Reverse	1	Quote				
232	EXTERIOR LIGHTS	4 LED Headlights (Low & High Beam)	1	Quote				
233	EXTERIOR LIGHTS	7" Diameter LED Tail Lights--Turn, Tail, Stop, Reverse	1	Quote				
234	EXTERIOR LIGHTS	Add 4" Diameter LED Brake Light--Each	1	Quote				
235	EXTERIOR LIGHTS	Add 7" Diameter LED Brake Light--Each	1	Quote				
236	EXTERIOR LIGHTS	Add 18" Red LED Strip Brake Light--Each	1	Quote				
237	EXTERIOR LIGHTS	Add 18" Amber LED Strip Brake Light--Each	1	Quote				
238	EXTERIOR LIGHTS	Add Red LED "STOP" Sign	1	Quote				
239	EXTERIOR LIGHTS	Add Amber Triangle Style LED "Yield" Sign	1	Quote				
240	EXTERIOR LIGHTS	2 LED Headlights (Low Beam Only)	1	Quote				
241	EXTERIOR LIGHTS	2 LED Headlights (High Beam Only)	1	Quote				
242	EXTERIOR LIGHTS	Dual Halogen Headlights (Low & High Beam Only)	1	Quote				
243	EXTERIOR LIGHTS	Fog Lights	1	Quote				
244	EXTERIOR LIGHTS		1					
245	EXTERIOR LIGHTS		1					
246	EXTERIOR LIGHTS		1					
247	EXTERIOR LIGHTS		1					
248	EXTERIOR LIGHTS		1					
249	EXTERIOR LIGHTS		1					
250	EXTERIOR MIRRORS	B&R 10"x11", 2-Piece, Heated, Remote Control (Both Sides)	1	$ 169.34	Quote	Quote	Quote	Quote
251	EXTERIOR MIRRORS	B&R 8"x8", 1-Piece, Remote Control Both Sides, Stainless Steel Arms	1	$ 39.56	Quote	Quote	Quote	Quote
252	EXTERIOR MIRRORS	B&R 8"x10", 2-Piece, Heated, Remote Control (Both Sides)	1	$ 233.38	Quote	Quote	Quote	Quote
253	EXTERIOR MIRRORS	B&R 8"x15", 2-Piece, Heated, Remote Control (Both Sides)	1	$ 220.62	Quote	Quote	Quote	Quote
254	EXTERIOR MIRRORS	B&R 10"x13", 1-Piece, Heated, Remote Control (Both Sides)	1	$ 51.60	Quote	Quote	Quote	Quote
255	EXTERIOR MIRRORS	Delete Remote Control (Per Side)	1	$ 543.40	Quote	Quote	Quote	Quote
256	EXTERIOR MIRRORS	Add Turn Signal Indicator on Exterior Mirror Head	1	$ 1,203.92	Quote	Quote	Quote	Quote
257	EXTERIOR MIRRORS	5" Mirror Front Bike Rack Mirror	1	$ 658.22	Quote	Quote	Quote	Quote

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
258	EXTERIOR MIRRORS		1					
259	EXTERIOR MIRRORS		1					
260	EXTERIOR MIRRORS		1					
261	EXTERIOR MIRRORS		1					
262	EXTERIOR MIRRORS		1					
263	FARE COLLECTION	No Farebox , Provide Power Circuit and Groundstrap Only	1	Standard				
264	FARE COLLECTION	GFI 41" Tall Odyssey	1	$ 17,433.30	$ 17,433.30	Quote	Quote	Quote
265	FARE COLLECTION	Add Farebox Lamp, Ceiling mounted	1	$ 65.00	Quote	Quote	Quote	Quote
266	FARE COLLECTION	Install Customer Provided Farebox Base Plate	1	Quote				
267	FARE COLLECTION		1					
268	FARE COLLECTION		1					
269	FARE COLLECTION		1					
270	FIRE SUPPRESSION SYSTEM	Fogmaker Water Mist Fire Suppression System	1	Quote				
271	FIRE SUPPRESSION SYSTEM	Amerex V-25 Fire Suppression System	1	Standard				
272	FIRE SUPPRESSION SYSTEM	Kidde Dual Spectrum LTD Fire Detection and Suppression System	1	Quote				
273	FIRE SUPPRESSION SYSTEM	Add Kidde Armored LTD	1	Quote				
274	FIRE SUPPRESSION SYSTEM	Add Kidde TLSE	1	Quote				
275	FIRE SUPPRESSION SYSTEM	Add Kidde Optical Sensor (each)	1	Quote				
276	FIRE SUPPRESSION SYSTEM		1					
277	FIRE SUPPRESSION SYSTEM		1					
278	FIRE SUPPRESSION SYSTEM		1					
279	FLOORING	Greenwood ACQ Plywood	1	Quote				
280	FLOORING	Altro Transflor	1	Quote				
281	FLOORING	RCA Rubber Flooring	1	Quote				
282	FLOORING	Composite Sub Floor	1	Standard				
283	FLOORING	Gerflor Tarabus Helios Flooring	1	Standard				
284	FLOORING	Stainless Steel Trim on Risers and Wheelhousings	1	Quote				
285	FLOORING		1					
286	FLOORING		1					
287	FLOORING		1					
288	FRAME	None	1					
289	FRAME	Engine Skid Protection with Extended Tow Eyes	1	N/A				
290	FRAME	Engine Skid Protection W/ Extended Tow Eyes & 2" Thick x 2" Wide Wear Plate	1	N/A				
291	FRAME	Reinforced A-Post Skid Plates (Per Side)	1	Quote				
292	FRAME	Frame Undercoating	1	Quote				
293	FRAME		1					
294	FRAME		1					
295	FRAME		1					
296	GAUGES--DRIVERS DASH	Speedometer, Air Pressure Gauge, 12/24 volt Gauges, Coolant Temp Gauge, State of Charge	1	Standard				
297	GAUGES--DRIVERS DASH	Add Low State of Charge Alarm	1	Quote				
298	GAUGES--DRIVERS DASH	Add Low State of Charge Warning Indicator	1	Standard				
299	GAUGES--DRIVERS DASH	Add Engine Hour Meter	1	N/A				
300	GAUGES--DRIVERS DASH	Add Auxiliary Stop Request Light	1	Quote				
301	GAUGES--DRIVERS DASH	Add Mutil Function Display (MFD)	1	Standard				
302	GAUGES--DRIVERS DASH		1					
303	GAUGES--DRIVERS DASH		1					
304	GAUGES--DRIVERS DASH		1					
305	HEATING/AIR CONDITIONING	Thermo King TE-14 All-Electric	1	$ 24,605.00	Quote	Quote	Quote	Quote
306	HEATING/AIR CONDITIONING	Sutrak All-Electric HVAC SYSTEM--(Roof Mounted/Rear Mounted HVAC system)	1	Quote				
307	HEATING/AIR CONDITIONING	SanUVAire- Safe Breathe Air Purification System	1	Quote				
308	HEATING/AIR CONDITIONING	Thermo King Pressure and Return Display Mounted to Unit	1	$ 540.00	Quote	Quote	Quote	Quote

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
309	HEATING/AIR CONDITIONING	BYD HVAC	1	Standard				
310	HEATING/AIR CONDITIONING		1					
311	HUBOMETER	Veeder Root Mechanical without Tenths, without Guard	1	$ 246.00	Quote	Quote	Quote	Quote
312	HUBOMETER	E J Ward Data System (Includes CANceiver, Display Unit, and Antenna)	1	Quote				
313	HUBOMETER	Engler (Stemco) Mechanical without Tenths, without Guard	1	$ 109.44	Quote	Quote	Quote	Quote
314	HUBOMETER	S/A Fleetwatch Data Logger JX 55	1	$ 1,030.50	Quote	Quote	Quote	Quote
315	HUBOMETER	Add Hubodometer Guard	1	$ 101.40	Quote	Quote	Quote	Quote
316	HUBOMETER		1					
317	HUBOMETER		1					
318	HUBOMETER		1					
319	INTERIOR LIGHTS	LED Interior Lights	1	Standard				
320	INTERIOR LIGHTS		1					
321	INTERIOR LIGHTS		1					
322	INTERIOR MIRRORS	8.25" x 16" Interior Rear View Mirror, Flat Faced	1	Standard				
323	INTERIOR MIRRORS	12" Convex at Rear Door Stanchion	1	Standard				
324	INTERIOR MIRRORS	6" Flat Faced Spot Mirror at Bottom of Front Destination Sign Compartment	1	$ 35.72	Quote	Quote	Quote	Quote
325	INTERIOR MIRRORS	4.75" x 15" Interior Mirror, Flat Faced	1	$ 26.97	Quote	Quote	Quote	Quote
326	INTERIOR MIRRORS		1					
327	INTERIOR MIRRORS		1					
328	ITS SYSTEM	None	1	Standard				
329	ITS SYSTEM	Avail IVU with MDC, GPS, APC, and WLAN	1	Quote				
330	ITS SYSTEM	Avail System Pre-Wire (IVU, MDT, APC, Fare Box)	1	Quote				
331	ITS SYSTEM	Clever Devices IVN 5 (AVL/GPS/CAD/Automatic Stop Annunciation)	1	$ 16,801.60	Quote	Quote	Quote	Quote
332	ITS SYSTEM	Clever Devices Automatic Vehicle Monitoring System	1	$ 4,773.50	Quote	Quote	Quote	Quote
333	ITS SYSTEM	Clever Devices BusTime System	1	$ 2,954.10	Quote	Quote	Quote	Quote
334	ITS SYSTEM	Clever Devices CleverCAD System	1	$ 4,380.80	Quote	Quote	Quote	Quote
335	ITS SYSTEM	Clever Devices CleverVision	1	$ 14,407.30	Quote	Quote	Quote	Quote
336	ITS SYSTEM	Clever Devices Secure Bus Access System	1	$ 2,656.00	Quote	Quote	Quote	Quote
337	ITS SYSTEM	Clever Devices Turn Warning System	1	$ 2,993.70	Quote	Quote	Quote	Quote
338	ITS SYSTEM	Opticom Traffic Signal Priority	1	Quote				
339	ITS SYSTEM	MobileEye Collision Avoidance System	1	$ 6,490.00	Quote	Quote	Quote	Quote
340	ITS SYSTEM	Transloc Transit Visualization System AVL	1	Quote				
341	ITS SYSTEM	Intelligent Vehicle System Prewire Only (Pending System Specification)	1	$ 15,913.60	Quote	Quote	Quote	Quote
342	ITS SYSTEM	Luminator InfoTransit--2 Monitors (18.5") Proxys Module	1	$ 2,290.00	Quote	Quote	Quote	Quote
343	ITS SYSTEM	Luminator InfoTransit--Upgrade to 29" Monitors	1	$ 4,620.00	Quote	Quote	Quote	Quote
344	ITS SYSTEM	Luminator InfoTransit--Upgrade to 37" Monitors	1	$ 5,346.00	Quote	Quote	Quote	Quote
345	ITS SYSTEM	Luminator InfoLite--2 Monitors (18.5") Proxys Module	1	$ 2,090.00	Quote	Quote	Quote	Quote
346	ITS SYSTEM	Luminator InfoLite--Upgrade to 29" Monitors	1	$ 4,620.00	Quote	Quote	Quote	Quote
347	ITS SYSTEM	Luminator InfoLite--Upgrade to 37"Monitors	1	$ 5,346.00	Quote	Quote	Quote	Quote
348	ITS SYSTEM		1	$ -				
349	ITS SYSTEM	Notes: ITS Specs and BOM will vary by project detailed spec. New updated quote based on updated needs to be provided for each project. All price above is based on vendor base specs.	1					
350	ITS SYSTEM		1					
351	ITS SYSTEM		1					
352	ITS SYSTEM		1					
353	ITS SYSTEM		1					
354	ITS SYSTEM		1					

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
355	ITS SYSTEM		1					
356	ITS SYSTEM		1					
357	ITS SYSTEM		1					
358	MISCELLANOUS	Scissor Style Sunshades--Drivers Windows	1	Standard				
359	MISCELLANOUS	Drivers Coat Hook	1	Standard				
360	MISCELLANOUS	Roller Style Sunshades--Drivers Windows	1	Quote				
361	MISCELLANOUS	Euramatic Cup Holder	1	$ 31.20	Quote	Quote	Quote	Quote
362	MISCELLANOUS	Registration Card holder	1	$ 11.69	Quote	Quote	Quote	Quote
363	MISCELLANOUS	Stainless Steel Waste Basket and Bracket	1	$ 22.10	Quote	Quote	Quote	Quote
364	MISCELLANOUS		1	$ -				
365	MISCELLANOUS		1	$ -				
366	MISCELLANOUS		1	$ -				
367	MODESTY PANELS	Standard Melamine Panels on Lower Section	1	Standard				
368	MODESTY PANELS	Quick Changing Glazing Upper Clear Plexiglas Modesty Panels Both Sides of Rear Exit Door	1	Quote				
369	MODESTY PANELS	Front Door Modesty Panel	1	Quote				
370	MODESTY PANELS	Lower Modesty Panel Forward of Rear Door	1	Quote				
371	MODESTY PANELS	Melamine Panel Lower Section (Aft Rear Door)	1	Quote				
372	MODESTY PANELS	Upper Clear Plexiglas Modesty Panel Forward Rear Door	1	Quote				
373	MODESTY PANELS		1	$ -				
374	MODESTY PANELS		1	$ -				
375	MODESTY PANELS		1	$ -				
376	PAINT	One Color w/ Black Mask at Windows	1	Quote				
377	PAINT	Add--Additional Color--Per Pass	1	Quote				
378	PAINT	Add--Clear Coat	1	Standard				
379	PAINT	Add Roof Numbers	1	Quote				
380	PAINT	Custom Paint / Decal Design (Per Spec)	1	Quote				
381	PAINT	White Color w/ Black Mask at Windows	1	Standard				
382	PAINT		1	$ -				
383	PAINT	Notes: Paint price and labor hours varies a lot by spec requested.	1	$ -				
384	PAINT		1	$ -				
385	PASSENGER BARRIERS	Wheelchair Barrier--Curbisde Aft of ADA Area	1	N/A				
386	PASSENGER BARRIERS	Wheelchair Barrier--Streetside Aft of ADA Area	1	N/A				
387	PASSENGER BARRIERS		1	$ -				
388	PASSENGER BARRIERS		1	$ -				
389	PASSENGER SEATING	USSC 4ONE Gemini	1	Standard				
390	PASSENGER SEATING	Kiel North America Citos	1	$ 5,435.65	Quote	Quote	Quote	Quote
391	PASSENGER SEATING	Kiel North America Intra	1	$ 6,658.85	Quote	Quote	Quote	Quote
392	PASSENGER SEATING	USSC 4One Angel	1	$ 2,101.00	Quote	Quote	Quote	Quote
393	PASSENGER SEATING	AMSECO Vision	1	$ 2,185.70	Quote	Quote	Quote	Quote
394	PASSENGER SEATING	AMSECO Insight	1	$ 3,334.10	Quote	Quote	Quote	Quote
395	PASSENGER SEATING	AMESCO Insight Prime Plus	1	$ 10,384.00	Quote	Quote	Quote	Quote
396	PASSENGER SEATING	Add--USB Charging Ports at Passenger Locations	1	$ 100.80	Quote	Quote	Quote	Quote
397	PASSENGER SEATING	Add--Hinged Rear Settee	1	$ 1,402.80	Quote	Quote	Quote	Quote
398	PASSENGER SEATING	Add--3rd Step To Perimeter Seating (Except Settee)	1	$ 1,485.60	Quote	Quote	Quote	Quote
399	PASSENGER SEATING	Notes: Standard spec comes with basic ADA restraints. (Example: Upgrade to Q'Pod and Quantum will be additional cost)	1	$ -				
400	PASSENGER SEATING	Notes: Seating layout can be quoted again once the layout is confirmed.	1	$ -				
401	PASSENGER SEATING	Notes: Price is based on 40', Other models differ with quotation upon request.	1	$ -				
402	PASSENGER SEATING		1	$ -				
403	PASSENGER SEATING		1	$ -				
404	PASSENGER SIGNALS	Pull Cords (Neutral) with Touch Pad at Wheelchair Location	1	Standard				
405	PASSENGER SIGNALS	Stop Request Button At Rear Door Stanchion	1	Standard				

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
406	PASSENGER SIGNALS	Touch Tape (At Window Mullions)	1	$ 60.00	Quote	Quote	Quote	Quote
407	PASSENGER SIGNALS		1	$ -				
408	PASSENGER SIGNALS		1	$ -				
409	PASSENGER SIGNALS		1	$ -				
410	PASSENGER WINDOWS	Ricon Hidden Frame/Bonded--Full Fixed	1	Standard				
411	PASSENGER WINDOWS	Ricon Standard Frame, Safety Glass--Full Sliders	1	Standard				
412	PASSENGER WINDOWS	Ricon Standard Frame, Safety Glass--Full Fixed	1	Standard				
413	PASSENGER WINDOWS	Add Thermo Guard to Ricon Standard Frame	1	Quote				
414	PASSENGER WINDOWS	Add Thermo Guard to Ricon Hidden Frame/Bonded	1	Quote				
415	PASSENGER WINDOWS	Arow Standard Frame, Safety Glass--Full Sliders	1	Quote				
416	PASSENGER WINDOWS	Arow Standard Frame, Safety Glass--Full Fixed	1	Quote				
417	PASSENGER WINDOWS	Arow Hidden Frame/Bonded--Full Fixed	1	Quote				
418	PASSENGER WINDOWS	Add Thermo Guard to Arow Standard Frame	1	Quote				
419	PASSENGER WINDOWS	Add Thermo Guard to Arow Hidden Frame/Bonded	1	Quote				
420	PASSENGER WINDOWS	Add Window Guards (Acrylic or Film)	1	$ 653.40	Quote	Quote	Quote	Quote
421	PASSENGER WINDOWS	Above quote is for each piece of window	1					
422	PASSENGER WINDOWS	Ricon Hidden Frame - Full Fixed + Transom	1	Standard				
423	PASSENGER WINDOWS		1	$ -				
424	PASSENGER WINDOWS		1	$ -				
425	PASSENGER WINDOWS		1	$ -				
426	PUBLIC ANNOUNCEMENT SYSTEM	PA with Handheld Mic w / (8) Flush Mount Speakers 40' (6) w / 30'	1	Quote				
427	PUBLIC ANNOUNCEMENT SYSTEM	(1) Interior/Both/Exterior Speaker Selct Toggle Switch without Guard & (1) Rheostat Volume Control with XLR Mic Jack	1	Quote				
428	PUBLIC ANNOUNCEMENT SYSTEM	Boom Microphone--Soundview SVA50SF (24") without ON/OFF Switch on Microphone, Momentary Button toe Switch, Floor Bracket Mounted	1	Quote				
429	PUBLIC ANNOUNCEMENT SYSTEM	Clever Devises - Speakeasy II	1	$ 2,007.20	Quote	Quote	Quote	Quote
430	PUBLIC ANNOUNCEMENT SYSTEM	Luminator VAS System	1	$ 6,597.50	Quote	Quote	Quote	Quote
431	PUBLIC ANNOUNCEMENT SYSTEM	Clever Devices Automated Voice Announcement System	1	$ 3,165.50	Quote	Quote	Quote	Quote
432	PUBLIC ANNOUNCEMENT SYSTEM	REI PA System w/ Mic + Interior and Exterior Speakers	1	Standard				
433	PUBLIC ANNOUNCEMENT SYSTEM		1	$ -				
434	PUBLIC ANNOUNCEMENT SYSTEM		1	$ -				
435	REAR RUN GAUGES	Add Hour Meter	1	Quote				
436	REAR RUN GAUGES	Add A/C Hour Meter	1	Quote				
437	REAR RUN GAUGES	Add Coolant Temperature--Mechanial	1	Quote				
438	REAR RUN GAUGES	Add Coolant Temperature--Electrical	1	Quote				
439	REAR RUN GAUGES	Add Voltmeter (12V or 24V)	1	Quote				
440	REAR RUN GAUGES		1					
441	REAR RUN GAUGES		1					
442	REAR RUN GAUGES		1					
443	REAR RUN GAUGES		1					
444	ROOF HATCHES	Manual Hatch at Front and Rear Positions	1	Standard				
445	ROOF HATCHES	Delete (1) Roof hatch	1	Quote				
446	ROOF HATCHES		1	$ -				
447	ROOF HATCHES		1	$ -				
448	SAFETY EQUIPMENT	5LBS ABC Fire Extinguisher (Mounted Behind Driver Seat)	1	Standard				
449	SAFETY EQUIPMENT	Safety Triangles (K-D 610-4645)	1	$ 36.30	Quote	Quote	Quote	Quote
450	SAFETY EQUIPMENT	Bio- Hazard Disposal Kit	1	$ 112.43	Quote	Quote	Quote	Quote
451	SAFETY EQUIPMENT	Blood Born Pathogens Kit	1	$ 28.49	Quote	Quote	Quote	Quote
452	SAFETY EQUIPMENT	Ten Unit First Aid Kit	1	$ 82.49	Quote	Quote	Quote	Quote
453	SAFETY EQUIPMENT	Wheel Chocks (Per Set)	1	$ 28.43	Quote	Quote	Quote	Quote

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
454	SAFETY EQUIPMENT		1	$ -				
455	SAFETY EQUIPMENT		1	$ -				
456	SAFETY EQUIPMENT		1	$ -				
457	SAFETY EQUIPMENT		1	$ -				
458	SCHEDULE RACK	NONE	1	Standard				
459	SCHEDULE RACK	(1) Schedule Holder OBIC 20/9 4PW-49/923BO- 4 Slots,Gray Color	1	$ 282.00	Quote	Quote	Quote	Quote
460	SCHEDULE RACK	22" x 21" Black, RH Load Open Back	1	Quote				
461	SCHEDULE RACK	Innocom Schedule Racks 3.75" x 7" x 1.5"	1	Quote				
462	SCHEDULE RACK	Innocom Schedule Racks 8.62" x 1 1" x 1"	1	Quote				
463	SCHEDULE RACK	OBIC To (4) Quad Pamphlet & (1) Single Pamphlet Holders	1	$ 226.80	Quote	Quote	Quote	Quote
464	SCHEDULE RACK	Transit Info Products OBICT10P2LTRMC	1	$ 275.00	Quote	Quote	Quote	Quote
465	SCHEDULE RACK	Transit Information Products -19"x 21" OBIC 19/214P1LTRMC	1	$ 288.00	Quote	Quote	Quote	Quote
466	SCHEDULE RACK		1	$ -				
467	SCHEDULE RACK		1	$ -				
468	SCHEDULE RACK		1	$ -				
469	SCHEDULE RACK		1	$ -				
470	STANCHIONS/GRAB RAILS	Stainless Steel Vertical Stanchions, Grabrails, and Modesty Panel Tubes	1	Standard				
471	STANCHIONS/GRAB RAILS	Vinyl Coated Nylon Grab Straps--Each	1	Standard				
472	STANCHIONS/GRAB RAILS	Yellow Powder Coated Vertical Stanchions, Grab Rails, and Modesty Panel Tubes	1	Quote				
473	STANCHIONS/GRAB RAILS	Yellow Powder Coated Vertical Stanchions Only	1	Standard				
474	STANCHIONS/GRAB RAILS	Vehicle Stanchion at Front Wheel Wells--Each	1	Standard				
475	STANCHIONS/GRAB RAILS	Add Farebox Grabrail	1	$ -				
476	STANCHIONS/GRAB RAILS	Horizontal Grabrail on Curbside & Streetside Wheelhousing	1	Standard				
477	STANCHIONS/GRAB RAILS	SSTL Spring Loaded Grab Handle--Each	1	Quote				
478	STANCHIONS/GRAB RAILS		1	$ -				
479	STANCHIONS/GRAB RAILS		1	$ -				
480	STANCHIONS/GRAB RAILS		1	$ -				
481	STANCHIONS/GRAB RAILS		1	$ -				
482	STANCHIONS/GRAB RAILS		1	$ -				
483	STEERING SYSTEM	Douglas, Single Tilt, Without Column Turn Signal, Without High-Low Beam Switch	1	Standard				
484	STEERING SYSTEM	Steering Wheel--Standard 20" Non-Padded 3 Spoke Wheel with Center Horn Button	1	Quote				
485	STEERING SYSTEM	Ross Model TS 65	1	Quote				
486	STEERING SYSTEM	Steering Box--TRW TAS6505	1	Quote				
487	STEERING SYSTEM	TRW Electric Assisted Steering	1	Quote				
488	STEERING SYSTEM	VIP Textured Steering Wheel	1	Quote				
489	STEERING SYSTEM	BYD Steering Wheel -- Standard 20"	1	Standard				
490	STEERING SYSTEM	BYD EHPS	1	Standard				
491	STEERING SYSTEM		1					
492	STYLING PACKAGES	Standard Styling Package	1	Standard				
493	STYLING PACKAGES	Windshield 2-Piece	1	Standard				
494	STYLING PACKAGES	Windshield 1-Piece	1	Quote				
495	STYLING PACKAGES	BRT Front Cap Styling Only	1	Quote				
496	STYLING PACKAGES	BRT Front Cap, Rear Cap and Engine Door Styling	1	Quote				
497	STYLING PACKAGES	BRT PLUS Front Cap, Rear Cap, Roof Line and Engine Door Styling	1	Quote				
498	STYLING PACKAGES	BRT Roof Fairings, Front or Rear (each)	1	Quote				
499	STYLING PACKAGES		1	$ -				
500	STYLING PACKAGES		1	$ -				
501	STYLING PACKAGES		1	$ -				
502	STYLING PACKAGES		1	$ -				

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
503	SURVEILLANCE CAMERA SYSTEMS	Apollo (8) Standard Definition Color Camera System, 6TB HDD, GPS, Wireless, Impact Sensor	1	$ 3,289.60	Quote	Quote	Quote	Quote
504	SURVEILLANCE CAMERA SYSTEMS	Apollo--Add (1) Standard Definition Coler Camera	1	$ 296.40	Quote	Quote	Quote	Quote
505	SURVEILLANCE CAMERA SYSTEMS	Apollo--Delete (1) Standard Definition Color Camera	1					
506	SURVEILLANCE CAMERA SYSTEMS	Apollo--Add (1) High Definition Color Camera	1	$ 645.70	Quote	Quote	Quote	Quote
507	SURVEILLANCE CAMERA SYSTEMS	Apollo--Add 8TB HDD	1	$ 539.00	Quote	Quote	Quote	Quote
508	SURVEILLANCE CAMERA SYSTEMS	Apollo Back Up Camera with LCD Screen	1	$ 1,248.50	Quote	Quote	Quote	Quote
509	SURVEILLANCE CAMERA SYSTEMS	SEON NX-16 (7) Camera System, 2TB HDD, Wireless, GPS, Impact Sensor	1	$ 11,216.20	Quote	Quote	Quote	Quote
510	SURVEILLANCE CAMERA SYSTEMS	SEON Add (1) Standard Definition Color Camera	1	Quote				
511	SURVEILLANCE CAMERA SYSTEMS	SEON Add (1) High Definition Color Camera	1	Quote				
512	SURVEILLANCE CAMERA SYSTEMS	SEON Add Solid State Harddrive (SSD)	1	Quote				
513	SURVEILLANCE CAMERA SYSTEMS	AngelTrax (7) Standard Definition Color Camera System, 1TB HDD, Wireless, GPS, Impact Sensor	1	$ 3,551.40	Quote	Quote	Quote	Quote
514	SURVEILLANCE CAMERA SYSTEMS	AngelTrax--Add (1) Standard Definition Color Camera	1	$ 202.73	Quote	Quote	Quote	Quote
515	SURVEILLANCE CAMERA SYSTEMS	AngelTrax--Add (1) High Definition Color Camera	1	$ 226.13	Quote	Quote	Quote	Quote
516	SURVEILLANCE CAMERA SYSTEMS	AngelTrax--Add 1TB HDD (Double stacked 500GB HDD)	1	$ 405.46	Quote	Quote	Quote	Quote
517	SURVEILLANCE CAMERA SYSTEMS	March Network 5412 (10) Camera--Kalatel Mobileview	1	Quote				
518	SURVEILLANCE CAMERA SYSTEMS	Mobileview NVR7000 (10) Camera System, High Definition, 4TB HDD, Wireless, GPS, Impact Sensor	1	$ 5,900.00	Quote	Quote	Quote	Quote
519	SURVEILLANCE CAMERA SYSTEMS	Mobileview--Add (1) High Definition Camera	1	Quote				
520	SURVEILLANCE CAMERA SYSTEMS	Mobileview--Add Solid State Harddrive (SSD)	1	Quote				
521	SURVEILLANCE CAMERA SYSTEMS	REI Bus Watch Digital	1	$ 2,940.00	Quote	Quote	Quote	Quote
522	SURVEILLANCE CAMERA SYSTEMS	Camera Pre Wire Package	1	Quote				
523	SURVEILLANCE CAMERA SYSTEMS	Apollo Pre-wire package	1	Quote				
524	SURVEILLANCE CAMERA SYSTEMS		1					
525	SURVEILLANCE CAMERA SYSTEMS		1					
526	SURVEILLANCE CAMERA SYSTEMS		1					
527	SURVEILLANCE CAMERA SYSTEMS		1					
528	SURVEILLANCE CAMERA SYSTEMS		1					
529	SURVEILLANCE CAMERA SYSTEMS		1					
530	SURVEILLANCE CAMERA SYSTEMS		1					
531	SURVEILLANCE CAMERA SYSTEMS		1					
532	SURVEILLANCE CAMERA SYSTEMS		1					
533	TIRES	Agency Supplied Tires	1	Standard				
534	TIRES	OEM Supplied Tires	1	$ 4,620.00	Quote	Quote	Quote	Quote
535	TIRES	Tire Pressure Monitoring System	1	$ 1,375.00	Quote	Quote	Quote	Quote
536	TIRES		1	$ -				
537	TIRES		1	$ -				
538	TIRES		1	$ -				
539	TOWING	None	1	$ -				
540	TOWING	Cole Hersee 12063 Electrical Tow Connector	1	Quote				
541	TOWING	Delete Cole Hersee Tow Connector	1	$ -				
542	TOWING	Cole Hersee elecrical tow connecor	1	Standard				
543	TOWING	BYD Standard: Cole Hersee #12080(J) 7-way plug connector	1	Standard				
544	TOWING		1	$ -				
545	WHEELCHAIR RAMP	Lift U--Ramp (LU-18 Dual Mode Front Door Ramp Only)	1	Standard				
546	WHEELCHAIR RAMP	Ricon--6:1 Ratio, Single Slope Ramp – SSR - Front Door Only	1	Standard				
547	WHEELCHAIR RAMP	Ricon – 4:1 Ratio, FR2E - Front Door Only	1	Quote				

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
548	WHEELCHAIR RAMP	Notes: Above specs are applicable to BYD transit buses with 102' width.	1	$ -				
549	WHEELCHAIR RAMP	Wheelchair Lift for C10M BYD 45' Coach	1	Standard				
550	WHEELCHAIR RAMP		1	$ -				
551	WHEELCHAIR SECUREMENT	USSC--V-PRO-Reliant	1	Standard				
552	WHEELCHAIR SECUREMENT	Kiel North America K-Pod with Secubar	1	Quote				
553	WHEELCHAIR SECUREMENT	American Seating--Dual Auto Lok with Advanced Restraint Module (ARM)	1	$ 752.40	Quote	Quote	Quote	Quote
554	WHEELCHAIR SECUREMENT	American Seating--Advanced Restraint Module (ARM) with Remote Belt Release	1	$ 752.40	Quote	Quote	Quote	Quote
555	WHEELCHAIR SECUREMENT	American Seating--Q'Straint Q'Pod	1	$ 3,502.40	Quote	Quote	Quote	Quote
556	WHEELCHAIR SECUREMENT	USSC--Q'Straint Q' POD	1	$ 3,502.40	Quote	Quote	Quote	Quote
557	WHEELCHAIR SECUREMENT	Q'Straint Quantum	1	$ 11,494.50	Quote	Quote	Quote	Quote
558	WHEELCHAIR SECUREMENT	Belt Guard and Wheelchair Ramp Pan Identification Numbers	1	Quote				
559	WHEELCHAIR SECUREMENT		1	$ -				
560	WHEELCHAIR SECUREMENT		1	$ -				
561	WHEELCHAIR SECUREMENT		1	$ -				
562	WHEELCHAIR SECUREMENT		1	$ -				
563	WHEELS/RIMS	(7) Alcoa Aluminum Polished Finish with Durabrite	1	$ 372.00	Quote	Quote	Quote	Quote
564	WHEELS/RIMS	(7) Steel Powder Coated Finish, White or Black	1	N/A				
565	WHEELS/RIMS	(7) Alcoa Aluminum Clean & Buff Finish	1	$ 294.00	Quote	Quote	Quote	Quote
566	WHEELS/RIMS	(7) Alcoa Aluminum Polished Finish	1	$ 294.00	Quote	Quote	Quote	Quote
567	WHEELS/RIMS	(7) Alcoa Aluminum Clean & Buff Finish with Durabrite	1	$ 363.60	Quote	Quote	Quote	Quote
568	WHEELS/RIMS	Alcoa Wheels--Add Duraflange	1	$ 78.00	Quote	Quote	Quote	Quote
569	WHEELS/RIMS	Delete Spare Aluminum Wheel	1	Standard				
570	WHEELS/RIMS	Delete Spare Steel Wheel	1	Standard				
571	WHEELS/RIMS		1	$ -				
572	WHEELS/RIMS		1	$ -				
573	WHEELS/RIMS		1	$ -				
574	WHEELS/RIMS		1	$ -				
575	DECALS & SIGNAGE	ADA Priority Seat Decals--"PLEASE OFFER THESE SEATS TO THE ELDERLY AND PERSONS WITH DISABILITIES", White on Clear	1	Standard				
576	DECALS & SIGNAGE	Drivers Instructions & Warning--English, Black on White	1	Standard				
577	DECALS & SIGNAGE	Interior Rear Step Floor Decals--"WATCH YOUR STEP", White Lettering on Red Background	1	Standard				
578	DECALS & SIGNAGE	Interior Symbol Decals (3)--ISO Symbols, No Smoking/Eating/Drinking/Radio. White on Black	1	Standard				
579	DECALS & SIGNAGE	Vehicle Height Decal--English "Caution Clearance Height XX FT XX IN, Black on Yellow	1	Standard				
580	DECALS & SIGNAGE	Drivers /Passengers Standee Warning Decal for Florida--"It Is A Violation For This Bus To Be In Operation With Passengers Occupying The Area Forward Of Yellow Line. Therefore Passengers May Not Stand Forward Of The Yellow Line While Bus Is In Motion." White on Black	1	Standard				
581	DECALS & SIGNAGE	Wheechair Securement Decals--"WHEELCHAIR SEATING AREA SECUREMENTS ARE LOCATED BELOW THESE SEATS", Black on Optically Clear	1	Standard				
582	DECALS & SIGNAGE	TrilingualDecals	1	Quote				
583	DECALS & SIGNAGE	Yield Sign Decal	1	Standard				
584	DECALS & SIGNAGE		1	$ -				

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
585	DECALS & SIGNAGE		1	$ -				
586	DECALS & SIGNAGE		1	$ -				
587	DECALS & SIGNAGE		1	$ -				
588	MANUALS	Drivers, Service, Parts, Electrical, Vendor (Hardcopy) & Compact Disc (CD)--1 Set Hardcopy & 1 CD (Up to 3 buses ordered)	1	Standard				
589	MANUALS	Additional Driver's Handbook--Each	1	$ 80.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
590	MANUALS	Additional Service Manual (Hardcopy)--Each	1	$ 200.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
591	MANUALS	Additional Parts Manual (Hardcopy)--Each	1	$ 200.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
592	MANUALS	Additional Electrical Schematics (Hardcopy)--Each	1	$ 75.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
593	MANUALS	Additional Drivers, Service, Parts, or Electrical Schematics (CD)--Each	1	$ 50.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
594	MANUALS	Additional Vendor Manuals (Hardcopy)--Each	1	Included in item 590				
595	MANUALS	Additional Vendor Manuals (CD)--Each	1	Included in item 593				
596	MANUALS	Notes: BYD provides one set of printed manuals included in base price for each project	1	$ -				
597	MANUALS		1	$ -				
598	MANUALS		1	$ -				
599	MANUALS		1	$ -				
600	TRAINING	Operator Orientation Training--By Bus Manufacturer at Agency Property (Per Driver/Per Class)	1	$ 40.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
601	TRAINING	Maintenance Orientation Training--By Bus Manufacturer at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
602	TRAINING	Steering System--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
603	TRAINING	Chassis & Body--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
604	TRAINING	Door Systems--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
605	TRAINING	Suspension--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
606	TRAINING	Electrical & Electronics-----By Bus Manufacturer and/or OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
607	TRAINING	Air & Brake Systems--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
608	TRAINING	HVAC & Climate Controls--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
609	TRAINING	Wheelchair Ramp--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
610	TRAINING	Destination Sign--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
611	TRAINING	Fire Suppression--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
612	TRAINING	Camera System Training--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
613	TRAINING	Automatic Passenger Counting System--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
614	TRAINING	Fare Collection Training--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
615	TRAINING	ITS Technical Training--By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
616	TRAINING	EV HV Battery ESS By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
617	TRAINING	EV Proplusion Operation & Diagnostics By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
618	TRAINING	High Voltage Safety By OEM Supplier at Agency Property (Per Technician/Per Class)	1	$ 20.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
619	TRAINING		1					
620	TRAINING	Notes: 80 hours of BYD training are included in base bus price. Training price 200USD/HR, 10 trainee/class.	1	$ -				
621	TRAINING		1					
622	TRAINING		1					
623	TRAINING		1					
624	TRAINING MODULES	Thermo-King Intelligaire Training Module	1	$ 1,200.00	Quote	Quote	Quote	Quote
625	TRAINING MODULES	I/O Controls Multiplex Board	1	$ 18,700.00	Quote	Quote	Quote	Quote
626	TRAINING MODULES	Air Brake Training Board	1	$ 19,800.00	Quote	Quote	Quote	Quote
627	TRAINING MODULES	Vapor Door Training Module	1	Quote				
628	TRAINING MODULES		1					
629	TRAINING MODULES		1	$ -				
630	BATTERY	Battery Lease	1 Yr	Quote				
631	BATTERY	See Battery Lease option in attachment	1 Yr					
632	BATTERY		1 Yr					
	TOTAL			$ 5,587,534.33	$ 46,967.56	$ 20,000.00	$ -	$ -

PRICE OFFER

TOTAL PRICE

TOTAL PRICE OFFER ---> $ 5,654,501.89

NAME & TITLE OF OFFEROR'S REPRESENTATIVE:

Patrick Duan, SVP of Operations (print or type)

(Name & Title)

BYD Coach and Bus LLC

(Offeror's Name)

SIGNATURE & DATE:

(Signature of Offeror's Representative) Date 9/21/2021

Row Labels	Sum of Yr1	Sum of Yr2	Sum of Yr3	Sum of Yr 4	Sum of Yr5
ADVERTISING FRAMES					
AIR SYSTEM					
AUTOMATIC PASSENGER COUNTER					
AXLES & SEALS					
BATTERIES	100	100	100	100	100
BIKE RACKS					
BRAKES					
COMMUNICATIONS SYSTEM					
Cost of (1) 30FT, low floor, all electric bus, per the specifications	100	100	100	100	100
Cost of (1) 35FT, low floor, all electric bus, per the specifications					
Cost of (1) 40FT, low floor, all electric bus, per the specifications					
Cost of (1) Depot Charger					
DECALS & SIGNAGE					
DESTINATION SIGN SOFTWARE					
DESTINATION SIGNS					
DOOR SYSTEM					
DOOR SYSTEM--FRONT					
DOOR SYSTEM--REAR					
DRIVER BARRIER					
DRIVER CONTROLS					
DRIVER HEATERS					
DRIVERS SEAT					
ELECTRICAL EQUIPMENT CABINET					
EXTERIOR LIGHTS					
EXTERIOR MIRRORS					
FARE COLLECTION					
FIRE SUPPRESSION SYSTEM					
FLOORING					
FRAME					
GAUGES--DRIVERS DASH					
HEATING/AIR CONDITIONING					
HUBOMETER					
INTERIOR LIGHTS					
INTERIOR MIRRORS					
ITS SYSTEM					
MANUALS					
MISCELLANOUS					
MODESTY PANELS					
PAINT					
PASSENGER BARRIERS					
PASSENGER SEATING	100	100	100	100	100
PASSENGER SIGNALS					
PASSENGER WINDOWS					
PUBLIC ANNOUNCEMENT SYSTEM					
REAR RUN GAUGES					
ROOF HATCHES					
SAFETY EQUIPMENT					
SCHEDULE RACK					
STANCHIONS/GRAB RAILS					
STEEERING SYSTEM					
STEERING SYSTEM					
STYLING PACKAGES					
SURVEILLANCE CAMERA SYSTEMS					
TIRES					
TOWING					
TRAINING					
TRAINING MODULES					
WHEELCHAIR RAMP					
WHEELCHAIR SECUREMENT					
WHEELS/RIMS					
Grand Total	**300**	**300**	**300**	**300**	**300**

Cost by Description by Year

Description	Year 1	Year 2	Year 3	Year 4	Year 5	Total
ADVERTISING FRAMES	441.4176	0	0	0	0	441.4176
AIR SYSTEM	260	0	0	0	0	260
AUTOMATIC PASSENGER COUNTER	32016.49	0	0	0	0	32016.49
AXLES & SEALS	43.2	0	0	0	0	43.2
BATTERIES	109.2	0	0	0	0	109.2
BIKE RACKS	15442.43	9534.26	0	0	0	24976.69
BRAKES	0	0	0	0	0	0
COMMUNICATIONS SYSTEM	4014.739	0	0	0	0	4014.739
Cost of (1) 30FT, low floor, all electric bus, per the specifications	0	0	0	0	0	0
Cost of (1) 35FT, low floor, all electric bus, per the specifications	750000	0	0	0	0	750000
Cost of (1) 40FT, low floor, all electric bus, per the specifications	730000	0	0	0	0	730000
Cost of (1) Depot Charger	289418.6	20000	20000	0	0	329418.6
DECALS & SIGNAGE	0	0	0	0	0	0
DESTINATION SIGN SOFTWARE	5812.1	0	0	0	0	5812.1
DESTINATION SIGNS	47263.4	0	0	0	0	47263.4
DOOR SYSTEM	4824.632	0	0	0	0	4824.632
DOOR SYSTEM--FRONT	0	0	0	0	0	0
DOOR SYSTEM--REAR	557.4	0	0	0	0	557.4
DRIVER BARRIER	0	0	0	0	0	0
DRIVER CONTROLS	20.8	0	0	0	0	20.8
DRIVER HEATERS	67.6	0	0	0	0	67.6
DRIVERS SEAT	9082.6	0	0	0	0	9082.6
ELECTRICAL EQUIPMENT CABINET	0	0	0	0	0	0
EXTERIOR LIGHTS	0	0	0	0	0	0
EXTERIOR MIRRORS	3120.024	0	0	0	0	3120.024
FARE COLLECTION	17498.3	17433.3	0	0	0	34931.6
FIRE SUPPRESSION SYSTEM	0	0	0	0	0	0
FLOORING	0	0	0	0	0	0
FRAME	0	0	0	0	0	0
GAUGES--DRIVERS DASH	0	0	0	0	0	0
HEATING/AIR CONDITIONING	25145	0	0	0	0	25145
HUBOMETER	1487.34	0	0	0	0	1487.34
INTERIOR LIGHTS	0	0	0	0	0	0
INTERIOR MIRRORS	62.685	0	0	0	0	62.685
ITS SYSTEM	95682.6	0	0	0	0	95682.6
MANUALS	605	0	0	0	0	605
MISCELLANOUS	64.987	0	0	0	0	64.987
MODESTY PANELS	0	0	0	0	0	0
PAINT	0	0	0	0	0	0
PASSENGER BARRIERS	0	0	0	0	0	0
PASSENGER SEATING	33088.5	0	0	0	0	33088.5
PASSENGER SIGNALS	60	0	0	0	0	60
PASSENGER WINDOWS	653.4	0	0	0	0	653.4
PUBLIC ANNOUNCEMENT SYSTEM	11770.2	0	0	0	0	11770.2
REAR RUN GAUGES	0	0	0	0	0	0
ROOF HATCHES	0	0	0	0	0	0
SAFETY EQUIPMENT	288.12	0	0	0	0	288.12
SCHEDULE RACK	1071.8	0	0	0	0	1071.8
STANCHIONS/GRAB RAILS	0	0	0	0	0	0
STEEERING SYSTEM	0	0	0	0	0	0
STEERING SYSTEM	0	0	0	0	0	0
STYLING PACKAGES	0	0	0	0	0	0
SURVEILLANCE CAMERA SYSTEMS	30461.11	0	0	0	0	30461.11
TIRES	5995	0	0	0	0	5995
TOWING	0	0	0	0	0	0
TRAINING	400	0	0	0	0	400
TRAINING MODULES	39700	0	0	0	0	39700
WHEELCHAIR RAMP	0	0	0	0	0	0
WHEELCHAIR SECUREMENT	20004.1	0	0	0	0	20004.1
WHEELS/RIMS	1401.6	0	0	0	0	1401.6
Total	**2177934**	**46967.56**	**20000**	**0**	**0**	**2244902**

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 21, 2021

Build Your Dreams®

SUBMITTED BY:
BYD Coach & Bus LLC.
1800 South Figueroa Street
Los Angeles, CA 90015

BYD CONTACT PERSONNEL:
Patrick Duan, Senior VP of Operations
P: 213.880.8597 E. patrick.duan@byd.com

John Hatch, Southeast Regional Sales Manager,
P: 407.729.0406 E: john.hatch@byd.com

Maria Mendoza, Director of Bids and Grants
P: 213.356.3660 E: maria.mendoza1@byd.com

SUBMITTED TO:
Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 23, 2021

SECTION 3 — QUALIFICATIONS

SUBMITTED BY:
BYD Coach & Bus LLC.
1800 South Figueroa Street
Los Angeles, CA 90015

BYD CONTACT PERSONNEL:
Patrick Duan, Senior VP of Operations
P: 213.880.8597 E. patrick.duan@byd.com

John Hatch, Southeast Regional Sales Manager,
P: 407.729.0406 E: john.hatch@byd.com

Maria Mendoza, Director of Bids and Grants
P: 213.356.3660 E: maria.mendoza1@byd.com

SUBMITTED TO:
Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

THIS PROPOSAL INCLUDES INFORMATION THAT SHALL NOT BE DISCLOSED OUTSIDE OF PINELLAS SUNCOAST TRANSIT AUTHORITY. AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS PROPOSAL. IF, HOWEVER, A CONTRACT IS AWARDED TO THIS BYD AS A RESULT OF, OR IN CONNECTION WITH, THE SUBMISSION OF THIS INFORMATION, PINELLAS SUNCOAST TRANSIT AUTHORITY SHALL HAVE THE RIGHT TO DUPLICATE, USE, OR DISCLOSE THE INFORMATION TO THE EXTENT PROVIDED IN THE RESULTING CONTRACT. THIS RESTRICTION DOES NOT LIMIT PINELLAS SUNCOAST TRANSIT AUTHORITY'S RIGHT TO USE INFORMATION CONTAINED IN THIS INFORMATION IF IT IS OBTAINED FROM ANOTHER SOURCE WITHOUT RESTRICTION. THE INFORMATION SUBJECT TO THIS RESTRICTION IS CONTAINED ON ALL PAGES THAT FOLLOW.

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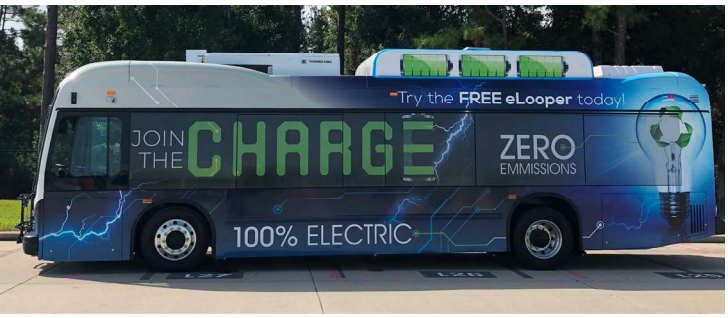

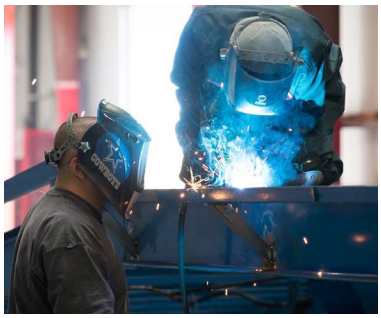

PRE-AWARD EVALUATION DATA FORM

CER 7. Pre-Award Evaluation Data Form

NOTE: This form is to be completed and included in the Qualification Package. Attach additional pages if required.

PSTA
RFP 21-980369

1. **Name of firm: BYD Coach and Bus LLC**
2. **Address: 1800 S. Figueroa St. Los Angeles, CA 90015**
3. ☐ **Individual** ☐ **Partnership** ☑ **Corporation** ☐ **Joint Venture**
4. **Date organized: April 2, 2013**
   State in which incorporated: California
5. **Names of officers or partners:**

a. Stella Li, President
b. Patrick Duan, Vice President of Operations
c. John Zhuang, Corporate Counsel
d. Boris Wang, Director of Finance
e.

6. **How long has your firm been in business under its present name? 8 years**

7. Attach as **SCHEDULE ONE** a list of similar current contracts that demonstrates your available capacity, including the quantity and type of bus, name of contracting party, percentage completed and expected completion date.

8. Attach as **SCHEDULE TWO** a list of at least three similar contracts that demonstrates your technical proficiency, each with the name of the contracting party and number and they type of buses completed within the last five years.

9. **Have you been terminated or defaulted, in the past five years, on any Contract you were awarded?**
☐ Yes ☑ No
If yes, then attach as **SCHEDULE THREE** the full particulars regarding each occurrence.

10. Attach as **SCHEDULE FOUR** Proposer's last three (3) financial statements prepared in accordance with generally accepted accounting principles of the jurisdiction in which the Proposer is located, and audited by an independent certified public accountant; or a statement from the Proposer regarding how financial information may be reviewed by the Agency (This may require execution of an acceptable nondisclosure agreement between the Agency and the Proposer.)

11. Attach as **SCHEDULE FIVE** a list of all principal Subcontractors and the percentage and character of Work (Contract amount) that each will perform on this Contract. N/A

12. If the Contractor or Subcontractor is a joint venture, submit **PRE-AWARD EVALUATION DATA** forms for each member of the joint venture.

The above information is confidential and will not be divulged to any unauthorized personnel.

The undersigned certifies to the accuracy of all information:
Name and title: Patrick Duan, Senior Vice President of Operations
Company: BYD Coach and Bus LLC

Authorized signature — Date: 9/21/21

CER 7. PRE-AWARD EVALUATION DATA FORM

SCHEDULE ONE

This schedule addresses the Pre-Award Evaluation Data form per requirements from your RFP section "CER 7. Pre-Award Evaluation Data Form" that calls for a list of similar contracts. In the chart below you will find a list of the current contract build buses that demonstrates our available capacity including the quantity and type of bus, name of contract party, percentage completed and expected completion date.

CUSTOMER NAME	QTY	MODEL	% COMPLETED	EXPECT COMPLETION DATE
City of Columbia	4	K7M	100	Completed
Kansas City International Airport	3	K7M	100	Completed
Macon Transit	2	K7M	100	Completed
Sonoma County	2	K7M	98	10.12.2021
Pinellas Suncoast Transportation Authority	4	K9S	95	10.14.2021
Anaheim Resort Transportation	10	K7M	90	10.30.2021
Anaheim Resort Transportation	20	K9M	25	Pilot Bus by 10/30/2021, All buses by 3/30/2022
San Francisco Municipal Transportation Agency	3	K9MD	10	Pilot Bus by 1/3/2021, All buses by 5/1/2021.
Charlotte Area Transportation	3	K9S	5	01.31.2021
Los Angeles County Metropolitan Transportation Authority	100	K9M	1	Pilot bus by 11/30/2020, 55 buses by 2021.
Los Angeles Department of Transportation	130	K7M	1	Pilot bus by 11/30/2020, 40 buses by 2021.
Long Beach Transit	14	K9M	1	Pilot Bus BY 1/6/2021, All buses
Fresno Area	2	K7M	0	02.02.2022
Martha's Vineyard	2	K9M	0	04.01.2022
Martha's Vineyard	1	K9S	0	04.01.2022

SCHEDULE TWO

SIMILAR CONTRACTS	SIMILAR CONTRACTS
Richard DeRock, General Manager LINK Transit 509.664.7610 richard@linktransit.com	Diana Kotler, Executive Director Anaheim Transportation Network 714.563.5287 dkotler@atnetwork.org
William J "Bill" Deville, Chief Executive Officer Capital Area Transit System 225.346.5559-direct 504.906.6183-mobile bdeville@brcats.com	Moses Stites, General Manager Fresno County Rural Transit 559.233.6789 x 244 mstites@fresnocog.org
Bryan Albee, Transit Systems Manager, Sonoma 707.585,7516 Bkalbee@sctransit.com	Corinne Ralph, Chief of Transit Programs LADOT 213.972.8408 corinne.ralph@lacity.org
Tony Cohen, Chief Maintenance Officer Sunline Transit 949.337.6871 (mobile) acohen@sunline.org	Lisa Maragnano Chattanooga Area Regional Transportation Authority CARTA 423.629.1411 lisamaragnano@gocarta.org
Roman Steichen, Director TransIT Services of Frederick County 301.600.3538 TransIT@FrederickCountyMD.gov	Dwayne Thompson Grand Prairie 780.538.0389 dthompson@cityofgp.com

SCHEDULE THREE

Currently, BYD Coach and Bus LLC does not have ongoing legal disputes that are materially averse to the company's future, smooth operations, or ability to perform under this procurement. The company from time-to-time encounters legal issues such as employee relations issues or frivolous claims typical to the region and industry. Furthermore, these issues do not have materially adverse impact to the company's future, smooth operations, or ability to perform under this procurement.

There has been some public information regarding legal issues with the City of Albuquerque as it is important to note that when the initial claim was put forth by the City it was a request to "Terminate for the City's Convenience". Today we can say that "BYD and the City have reached a settlement that resolves litigation, allowing the parties to move forward at no additional cost. Since the contract was terminated, both BYD and the City have engaged in good faith dialogue to reach this resolution. Although the parties made public statements in defense of their respective positions during the dispute, they are now committed to moving forward and wish each other success.

"The city supports BYD's pursuit of its mission to expand zero-emission public transportation with the next generation of high-quality electric buses. BYD supports the City's commitment to the Albuquerque Rapid Transit project and wishes the city best of luck on its completion and successful operation."

https://www.cabq.gov/transit/news/city-of-albuquerque-and-electric-bus-maker-byd-reach-settlement

SCHEDULE FOUR

BYD is publicly traded company and provides yearly financial records to investors. The agency can find BYD financials on any trading website such as Bloomberg or this information can be located on our website at the following address for review.

http://www.byd.com/en/InvestorAnnals.html?scroll=true

SCHEDULE FIVE

There are no major subcontractors for this procurement currently.

THREE (3) MOST RECENT FINANCIAL STATEMENTS

THREE (3) MOST RECENT FINANICAL STATEMENTS

BYD is publicly traded company and provides yearly financial records to investors. The agency can find BYD financials on any trading website such as Bloomberg or this information can be located on our website at the following address for review.

http://www.byd.com/en/InvestorAnnals.html?scroll=true

LETTER FOR INSURANCE

DURAN RISK & INSURANCE SERVICES
an affiliate of United Agencies, Inc., License # 0K02307
3257 E Guasti Ave., Suite 100 · Ontario, CA 91761

September 10, 2021

Attention: PSTA

RE: Insurance Requirements

To Whom It May Concern:

BYD Coach and Bus LLC meets the RFP insurance requirements as shown on the acord certificate of insurance provided.

Best Regards,

Edgar Duran, CIC, CLCS, CRIS, CISR

President/CEO

Duran Risk & Insurance Services, Inc.

BYDMOTO-01 CARLOSD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 8/9/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER License # 0252636 United Agencies 3257 E. Guasti Ave, Suite 100 Ontario, CA 91761	CONTACT NAME: Luz Duran PHONE (A/C, No, Ext): FAX (A/C, No): (929) 295-7377 E-MAIL ADDRESS: luzd@duraninsuranceservices.com
INSURED BYD Motors, LLC., BYD Coach & Bus, LLC., BYD Motors, Inc. 1800 S. Figueroa Street Los Angeles, CA 90015	INSURER(S) AFFORDING COVERAGE — NAIC # INSURER A : Lloyd's of London INSURER B : National Fire & Marine Insurance Company — 20079 INSURER C : Indemnity Insurance Company of North America — 43575 INSURER D : INSURER E : INSURER F :

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE / X OCCUR X GL Ded $50,000 X Garage Liab $1M/$2M GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY / PRO-JECT / LOC X OTHER: Garage Keepers Ded $50,000			GLL1021105	8/2/2021	8/2/2022	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG Garage Keepers	$ 1,000,000 $ 100,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $ 1,000,000
B	AUTOMOBILE LIABILITY ANY AUTO OWNED AUTOS ONLY / X SCHEDULED AUTOS HIRED AUTOS ONLY / NON-OWNED AUTOS ONLY X Deductible $2,500			73APB004824	7/3/2021	7/3/2022	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
A	UMBRELLA LIAB / X OCCUR X EXCESS LIAB / CLAIMS-MADE DED / X RETENTION $ 0			B0595XR6860021	8/2/2021	8/2/2022	EACH OCCURRENCE AGGREGATE	$ 5,000,000 $ 5,000,000
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y / N If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		4421700	10/1/2020	9/30/2021	X PER STATUTE / OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 1,000,000 $ 1,000,000 $ 1,000,000
A	Excess Liability			XS1137221	8/2/2021	8/2/2022	Occurrence	4,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

Proof of Insurance

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Edgar Duran

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FORM FOR PROPOSAL DEVIATION

CER 5. Form for Proposal Deviation

This form shall be completed for each condition, exception, reservation or understanding (i.e., Deviation) in the Proposal according to "Conditions, Exceptions, Reservations or Understandings." One copy without any price/cost information is to be placed in the Technical Proposal as specified in "Technical Proposal Requirements," and a separate copy with any price/cost information placed in the Price Proposal as specified in "Price Proposal Requirements."

PSTA
[RFP 21-980369]

Deviation No.: 1	**Contractor:** BYD	**RFP section:** TS 19 Altoona Testing	**Page:** 99
Complete description of Deviation: The BYD K9MD will complete the Altoona test on Q2 of 2022			
Rationale (pros and cons): This will ensure that the bus delivered will be Altoona Tested and required by the RFP.			

CER 5. Form for Proposal Deviation

This form shall be completed for each condition, exception, reservation or understanding (i.e., Deviation) in the Proposal according to "Conditions, Exceptions, Reservations or Understandings." One copy without any price/cost information is to be placed in the Technical Proposal as specified in "Technical Proposal Requirements," and a separate copy with any price/cost information placed in the Price Proposal as specified in "Price Proposal Requirements."

PSTA
[RFP 21-980369]

Deviation No.: 2	**Contractor:** BYD	**RFP section:** TS 19 Altoona Testing	**Page:** 99
Complete description of Deviation: The BYD C10M model will complete the Altoona test on Q4 of 2022			
Rationale (pros and cons): This will ensure that the bus delivered will be Altoona Tested and required by the RFP.			

PROPOSAL FORM

CER 9. Other Certifications

CER 9.1 Proposal Form

Proposer shall complete the following form and include it in the price Proposal.

PROPOSAL

By execution below by a duly authorized representative(s) of the Proposer, the Proposer hereby offers to furnish equipment and services as specified in its Proposal submitted to Pinellas Suncoast Transit Authority in response to Request for Proposal No. 21-980369 Electric Transit Buses with Charging and Associated Equipment

Proposer: BYD Coach and Bus LLC

Street address: 1800 S. Figueroa St.

City, state, ZIP: Los Angeles, CA 90015

Name and title of Authorized Signer(s): Patrick Duan, Senior Vice President of Operations

Name and title of Authorized Signer(s): _____

Phone: (213) 748-3980

_____ 9/21/21

Authorized signature Date

_____

Authorized signature Date

FEDERAL CERTIFICATIONS

BUY AMERICA CERTIFICATION

CER 8. Federal Certifications

CER 8.1 Buy America Certification

This form is to be submitted with an offer exceeding the small purchase threshold for federal assistance programs, currently set at $$150,000.

Certificate of Compliance

The Contractor hereby certifies that it will comply with the requirements of 49 USC 5323(j)(1) and (13), as amended, and the regulations of 49 CFR 661.11:

Name and title: Patrick Duan, Senior Vice President of Operations
Company: BYD Coach and Bus LLC

Authorized signature — Date: 9/21/21

OR

Certificate of Non-Compliance

The Contractor hereby certifies that it cannot comply with the requirements of 49 USC 5323(j)(1) and (13), as amended, but may qualify for an exception to the requirements consistent with 49 USC 5323(j)(1) and (13), as amended, and regulations in 49 CFR 661.7.

Name and title: N/A
Company:

Authorized signature — Date

DEBARMENT AND SUSPENSION CERTIFICATION FOR PROSPECTIVE CONTRACTOR

CER 8.2 Debarment and Suspension Certification for Prospective Contractor

Primary covered transactions must be completed by Proposer for contract value over $25,000.

Choose one alternative:

☑ The Proposer, BYD Coach and Bus LLC, certifies to the best of its knowledge and belief that it and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any federal department or agency;
2. Have not within a three-year period preceding this Proposal been convicted of or 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) transaction or Contract under a public transaction; violation of federal or state antitrust statutes or commission or embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
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 2 of this certification; and
4. Have not within a three-year period preceding this Proposal had one or more public transactions (federal, state or local) terminated for cause or default.

OR

☐ The Proposer is unable to certify to all of the statements in this certification, and attaches its explanation to this certification. (In explanation, certify to those statements that can be certified to and explain those that cannot.)

The Proposer certifies or affirms the truthfulness and accuracy of the contents of the statements submitted on or with this certification and understands that the provisions of Title 31 USC § Sections 3801 are applicable thereto.

Executed in Los Angeles, CA.

Name: Patrick Duan, Senior Vice President of Operations

Authorized signature

9/21/21

Date

DEBARMENT AND SUSPENSION CERTIFICATION (LOWER-TIER COVERED TRANSACTION)

CER 8.3 Debarment and Suspension Certification (Lower-Tier Covered Transaction)

This form is to be submitted by each Subcontractor receiving an amount exceeding $25,000.

The prospective lower-tier participant (Proposer) certifies, by submission of this Proposal, that neither it nor its "principals" as defined at 49 CFR § 29.105(p) is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any federal department or agency.

If the prospective Proposer is unable to certify to the statement above, it shall attach an explanation, and indicate that it has done so by placing an "X" in the following space: _____

THE PROPOSER, BYD Coach and Bus LLC **, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF EACH STATEMENT OF ITS CERTIFICATION AND EXPLANATION, IF ANY. IN ADDITION, THE PROPOSER UNDERSTANDS AND AGREES THAT THE PROVISIONS OF 31 USC §§ 3801 *ET SEQ*. APPLY TO THIS CERTIFICATION AND EXPLANATION, IF ANY.**

Name and title of the Proposer's authorized official:

Authorized signature

9/21/21

Date

NON-COLLUSION AFFIDAVIT

CER 8.4 Non-Collusion Affidavit

This affidavit is to be filled out and executed by the Proposer; if a corporation makes the bid, then by its properly executed agent. The name of the individual swearing to the affidavit should appear on the line marked "Name of Affiant." The affiant's capacity, when a partner or officer of a corporation, should be inserted on the line marked "Capacity." The representative of the Proposer should sign his or her individual name at the end, not a partnership or corporation name, and swear to this affidavit before a notary public, who must attach his or her seal.

State of California, County of Los Angeles

I, Yuefeng (Patrick) Duan, being first duly sworn, do hereby state that
(Name of Affiant)

I am Senior Vice President of Operations of BYD Coach and Bus LLC
(Capacity) (Name of Firm, Partnership or Corporation)

whose business is Manufacture of Electric Buses

and who resides at 1800 S. Figueroa St. Los Angeles, CA 90015

and that BYD Coach and Bus LLC
(Give names of all persons, firms, or corporations interested in the bid)

is/are the only person(s) with me in the profits of the herein contained Contract; that the Contract is made without any connection or interest in the profits thereof with any persons making any bid or Proposal for said Work; that the said Contract is on my part, in all respects, fair and without collusion or fraud, and also that no members of the Board of Trustees, head of any department or bureau, or employee therein, or any employee of the Agency, is directly or indirectly interested therein.

Signature of Affiant Date 8/25/2021

The foregoing instrument was sworn to before me by means of ☐ physical presence or ☐ online notarization this _____ day of _____, 20_____, by _____(name), as _____(type of authority)_____ on behalf of the ___(type of business entity)_____. She/he is [ ] personally known to me or [ ] has produced _____ (type of identification) as identification.

See Attached Certificate

Notary public My commission expires

Seal

CALIFORNIA JURAT **GOVERNMENT CODE § 8202**

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of California

County of Los Angeles

Subscribed and sworn to (or affirmed) before me on

this 25th day of August, 2021, by
Date *Month* *Year*

(1) Yuefeng Duan

(and (2) _____),
Name(s) of Signer(s)

proved to me on the basis of satisfactory evidence to be the person(s) who appeared before me.

Place Notary Seal and/or Stamp Above

Signature _____
Signature of Notary Public

OPTIONAL

Completing this information can deter alteration of the document or fraudulent reattachment of this form to an unintended document.

Description of Attached Document

Title or Type of Document: _____

Document Date: _____ Number of Pages: _____

Signer(s) Other Than Named Above: _____

©2019 National Notary Association

LOBBYING CERTIFICATION

CER 8.5 Lobbying Certification

This form is to be submitted with an offer exceeding $100,000.

The Proposer certifies, to the best its knowledge and belief, that:

1. No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of a federal department or agency, a member of the U.S. Congress, an officer or employee of the U.S. Congress, or an employee of a member of the U.S. 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 thereof.

2. If any funds other than federal appropriated funds have been paid or will be paid to any person for making lobbying contacts to an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal Contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form LLL, "Disclosure Form to Report Lobbying," in accordance with its instruction, as amended by "Government wide Guidance for New Restrictions on Lobbying," 61 Fed. Reg. 1413 (1/19/96).

3. 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 sub recipients 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, USC § 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.

THE PROPOSER, BYD Coach and Bus LLC **, CERTIFIES OR AFFIRMS THE TRUTHFULNESS AND ACCURACY OF EACH STATEMENT OF ITS CERTIFICATION AND DISCLOSURE, IF ANY. IN ADDITION, THE PROPOSER UNDERSTANDS AND AGREES THAT THE PROVISIONS OF 31 USC §§ 3801 ET SEQ. APPLY TO THIS CERTIFICATION AND DISCLOSURE, IF ANY.**

Name of the bidder or Proposer's authorized official: Patrick Duan

Title: Senior Vice President of Operations

Signature

9/21/21
Date

Per paragraph 2 of the included form Lobbying Certification, add Standard Form–LLL, "Disclosure Form to Report Lobbying," if applicable.

CERTIFICATE OF COMPLIANCE WITH BUS TESTING REQUIREMENT

CER 8.6 Certificate of Compliance with Bus Testing Requirement: K7 Model

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with 49 USC § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 according to the indicated one of the following three alternatives.

Mark one and only one of the three blank spaces with an "X."

1. ✓ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on 4/3/17 (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Proposal. If the configuration or components are not identical, then the manufacturer shall provide with its Proposal a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.

2. _____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Proposal the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

3. _____ The vehicle is a new model and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

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

Company name: BYD Coach and Bus LLC

Name and title of the Proposer's authorized official: Patrick Duan, Senior Vice President of Operations

Authorized signature

9/21/21

Date

CER 8.6 Certificate of Compliance with Bus Testing Requirement:K8M Model

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with 49 USC § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 according to the indicated one of the following three alternatives.

Mark one and only one of the three blank spaces with an "X."

1. ✓ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on 12/16/20 (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Proposal. If the configuration or components are not identical, then the manufacturer shall provide with its Proposal a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.

2. _____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Proposal the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

3. _____ The vehicle is a new model and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

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

Company name: BYD Coach and Bus LLC

Name and title of the Proposer's authorized official: Patrick Duan, Senior Vice President of Operations

Authorized signature

9/21/21

Date

CER 8.6 Certificate of Compliance with Bus Testing Requirement: K9M Model

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with 49 USC § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 according to the indicated one of the following three alternatives.

Mark one and only one of the three blank spaces with an "X."

1. ✓ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on 6/27/14 (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Proposal. If the configuration or components are not identical, then the manufacturer shall provide with its Proposal a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.

2. _____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Proposal the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

3. _____ The vehicle is a new model and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

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

Company name: BYD Coach and Bus LLC

Name and title of the Proposer's authorized official: Patrick Duan, Senior Vice President of Operations

Authorized signature

9/21/21

Date

CER 8.6 Certificate of Compliance with Bus Testing Requirement: K9MD Model

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with 49 USC § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 according to the indicated one of the following three alternatives.

Mark one and only one of the three blank spaces with an "X."

1. _____ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on _____ (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Proposal. If the configuration or components are not identical, then the manufacturer shall provide with its Proposal a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.

2. _____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Proposal the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

3. ✓ The vehicle is a new model and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

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

Company name: BYD Coach and Bus LLC

Name and title of the Proposer's authorized official: Patrick Duan, Senior Vice President of Operations

Authorized signature

9/21/21

Date

CER 8.6 Certificate of Compliance with Bus Testing Requirement: C10M

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with 49 USC § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 according to the indicated one of the following three alternatives.

Mark one and only one of the three blank spaces with an "X."

1. _____ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on _____ (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Proposal. If the configuration or components are not identical, then the manufacturer shall provide with its Proposal a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.

2. _____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Proposal the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

3. ✓ The vehicle is a new model and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

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

Company name: BYD Coach and Bus LLC

Name and title of the Proposer's authorized official: Patrick Duan, Senior Vice President of Operations

Authorized signature

9/21/21

Date

CER 8.6 Certificate of Compliance with Bus Testing Requirement: K11M Model

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with 49 USC § 5323(c) and FTA's implementing regulation at 49 CFR Part 665 according to the indicated one of the following three alternatives.

Mark one and only one of the three blank spaces with an "X."

1. ✓ The buses offered herewith have been tested in accordance with 49 CFR Part 665 on 1/16/20 (date). If multiple buses are being proposed, provide additional bus testing information below or on attached sheet. The vehicles being sold should have the identical configuration and major components as the vehicle in the test report, which must be submitted with this Proposal. If the configuration or components are not identical, then the manufacturer shall provide with its Proposal a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing. If multiple buses are being proposed, testing data on additional buses shall be listed on the bottom of this page.

2. _____ The manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), and submits with this Proposal the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

3. _____ The vehicle is a new model and will be tested and the results will be submitted to the Agency prior to acceptance of the first bus.

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

Company name: BYD Coach and Bus LLC

Name and title of the Proposer's authorized official: Patrick Duan, Senior Vice President of Operations

Authorized signature

9/21/21

Date

DBE APPROVAL CERTIFICATION

CER 8.7 DBE Approval Certification

I hereby certify that the Proposer has complied with the requirements of 49 CFR 26, Participation by Disadvantaged Business Enterprises in DOT Programs, and that its goals have not been disapproved by the Federal Transit Administration.

Name and title of the Proposer's authorized official: Patrick Duan, Senior Vice President of Operations

9/21/21

Authorized signature | Date

U.S. Department
Of Transportation
Federal Transit Administration

Headquarters

East Building, 5th Floor – TCR
1200 New Jersey Avenue, SE
Washington, DC 20590

August 31, 2021

Enid Santiago, DBELO
BYD Coach & Bus
46147 BYD Boulevard
Lancaster, CA 93534

Re: TVM DBE Goal Concurrence/Certification Letter – Fiscal Year 2022

Dear Ms. Santiago:

This letter is to inform you that the Federal Transit Administration's (FTA) Office of Civil Rights has received BYD Coach & Bus' Disadvantaged Business Enterprise (DBE) goal and methodology for FY 2022 for the period of October 1, 2021–September 30, 2022. This goal submission is required by the U.S. Department of Transportation's DBE regulations at 49 CFR Part 26 and must be implemented in good faith.

We have reviewed your firm's FY 2022 DBE goal and determined that it complies with DOT's DBE regulations. Your firm is eligible to bid on FTA-funded transit contracts. This letter or a copy of the TVM listing on FTA's website may be used to demonstrate your firm's compliance with DBE requirements when bidding on federally funded vehicle procurements.

FTA reserves the right to remove/suspend this concurrence if your DBE program or FY 2022 DBE goal is not implemented in good faith. In accordance with this good faith requirement, you must submit your DBE Uniform Report to FTA by December 1, 2021. This report should reflect all FTA-funded contracting activity for the second period of FY 2021 (i.e., from April 1 to September 30).

Also note that your FY 2023 DBE goal methodology must be submitted to FTA by August 1, 2022. Any significant updates to the program plan must be submitted to FTA as they occur. If you have any questions, please contact the FTA DBE Team via email at *FTATVMSubmissions@dot.gov*.

Sincerely,

John Day
Program Manager
Office of Civil Rights

FEDERAL MOTOR VEHICLE SAFETY STANDARDS

CER 8.8 Federal Motor Vehicle Safety Standards

The Proposer and (if selected) Contractor shall submit (1) manufacturer's FMVSS self-certification sticker information that the vehicle complies with relevant FMVSS or (2) manufacturer's certified statement that the contracted buses will not be subject to FMVSS regulations.

Company name: BYD Coach and Bus LLC
Name of signer: Patrick Duan
Title: Senior Vice President of Operations

Authorized signature

9/21/21
Date

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 21, 2021

Build Your Dreams®

SUBMITTED BY:
BYD Coach & Bus LLC.
1800 South Figueroa Street
Los Angeles, CA 90015

BYD CONTACT PERSONNEL:
Patrick Duan, Senior VP of Operations
P: 213.880.8597 E. patrick.duan@byd.com

John Hatch, Southeast Regional Sales Manager,
P: 407.729.0406 E: john.hatch@byd.com

Maria Mendoza, Director of Bids and Grants
P: 213.356.3660 E: maria.mendoza1@byd.com

SUBMITTED TO:
Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 23, 2021

SECTION 4 — PROPRIETARY/CONFIDENTIAL

SUBMITTED BY:
BYD Coach & Bus LLC.
1800 South Figueroa Street
Los Angeles, CA 90015

BYD CONTACT PERSONNEL:
Patrick Duan, Senior VP of Operations
P: 213.880.8597 E. patrick.duan@byd.com

John Hatch, Southeast Regional Sales Manager,
P: 407.729.0406 E: john.hatch@byd.com

Maria Mendoza, Director of Bids and Grants
P: 213.356.3660 E: maria.mendoza1@byd.com

SUBMITTED TO:
Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716

THIS PROPOSAL INCLUDES INFORMATION THAT SHALL NOT BE DISCLOSED OUTSIDE OF PINELLAS SUNCOAST TRANSIT AUTHORITY. AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED, IN WHOLE OR IN PART, FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS PROPOSAL. IF, HOWEVER, A CONTRACT IS AWARDED TO THIS BYD AS A RESULT OF, OR IN CONNECTION WITH, THE SUBMISSION OF THIS INFORMATION, PINELLAS SUNCOAST TRANSIT AUTHORITY SHALL HAVE THE RIGHT TO DUPLICATE, USE, OR DISCLOSE THE INFORMATION TO THE EXTENT PROVIDED IN THE RESULTING CONTRACT. THIS RESTRICTION DOES NOT LIMIT PINELLAS SUNCOAST TRANSIT AUTHORITY'S RIGHT TO USE INFORMATION CONTAINED IN THIS INFORMATION IF IT IS OBTAINED FROM ANOTHER SOURCE WITHOUT RESTRICTION. THE INFORMATION SUBJECT TO THIS RESTRICTION IS CONTAINED ON ALL PAGES THAT FOLLOW.

BYD Build Your Dreams®

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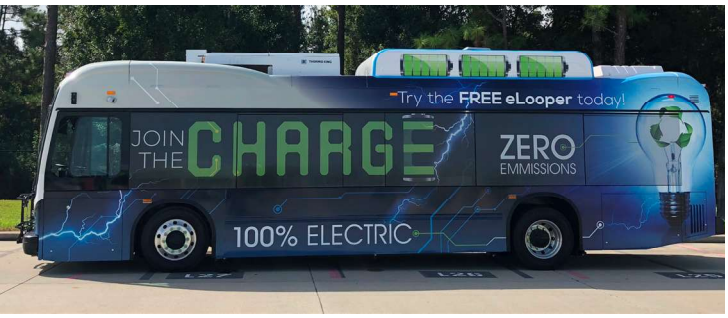

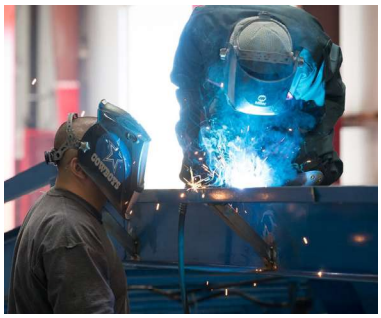

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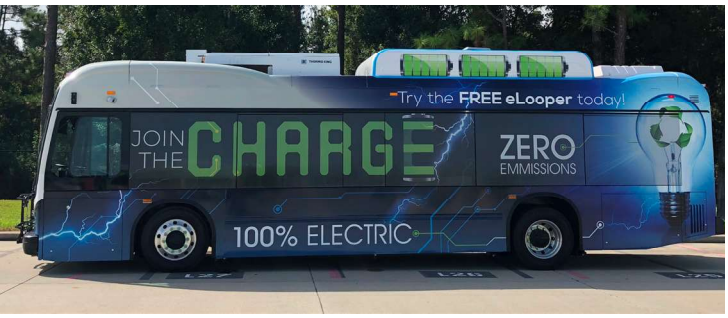
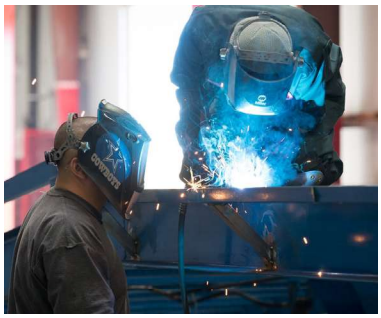
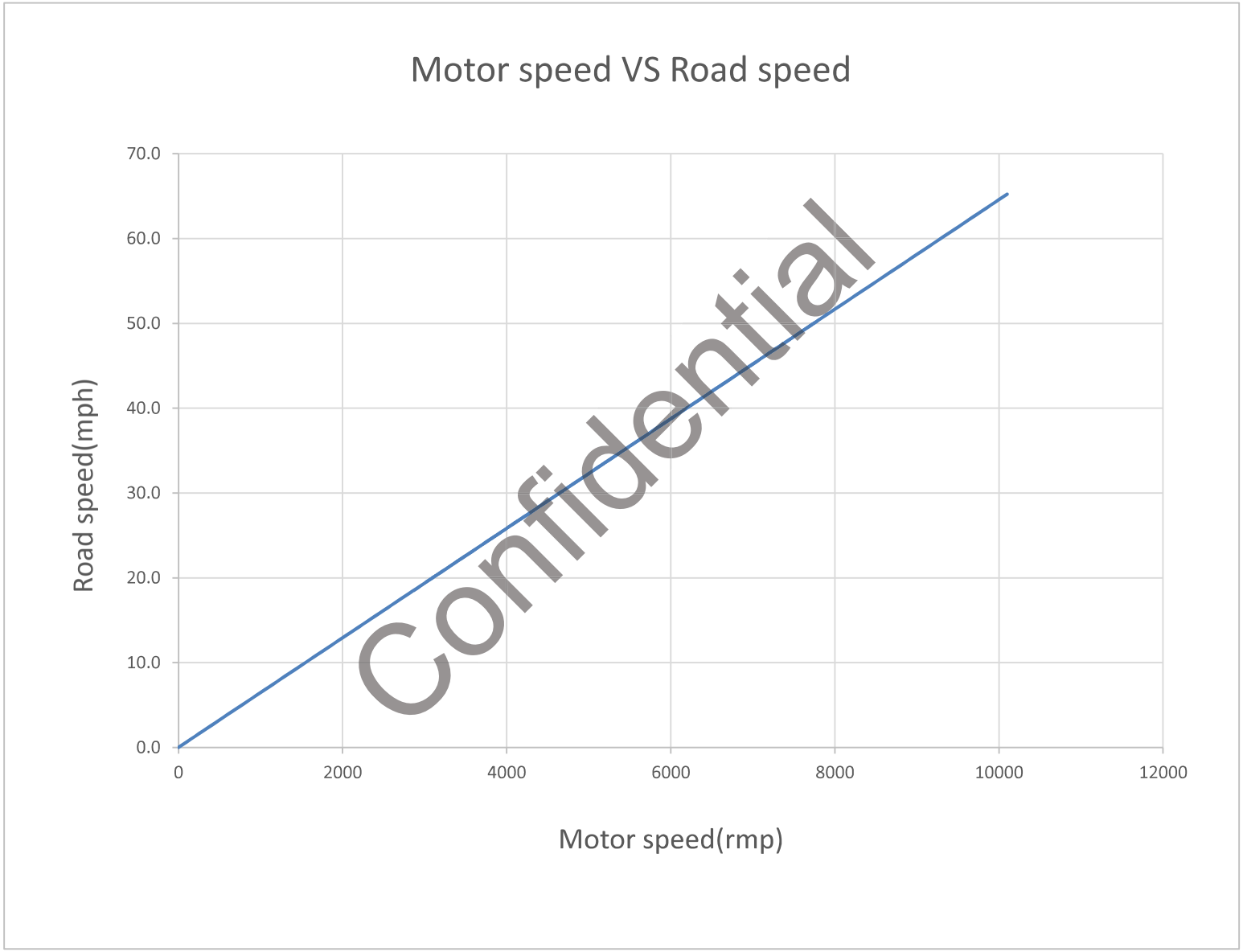


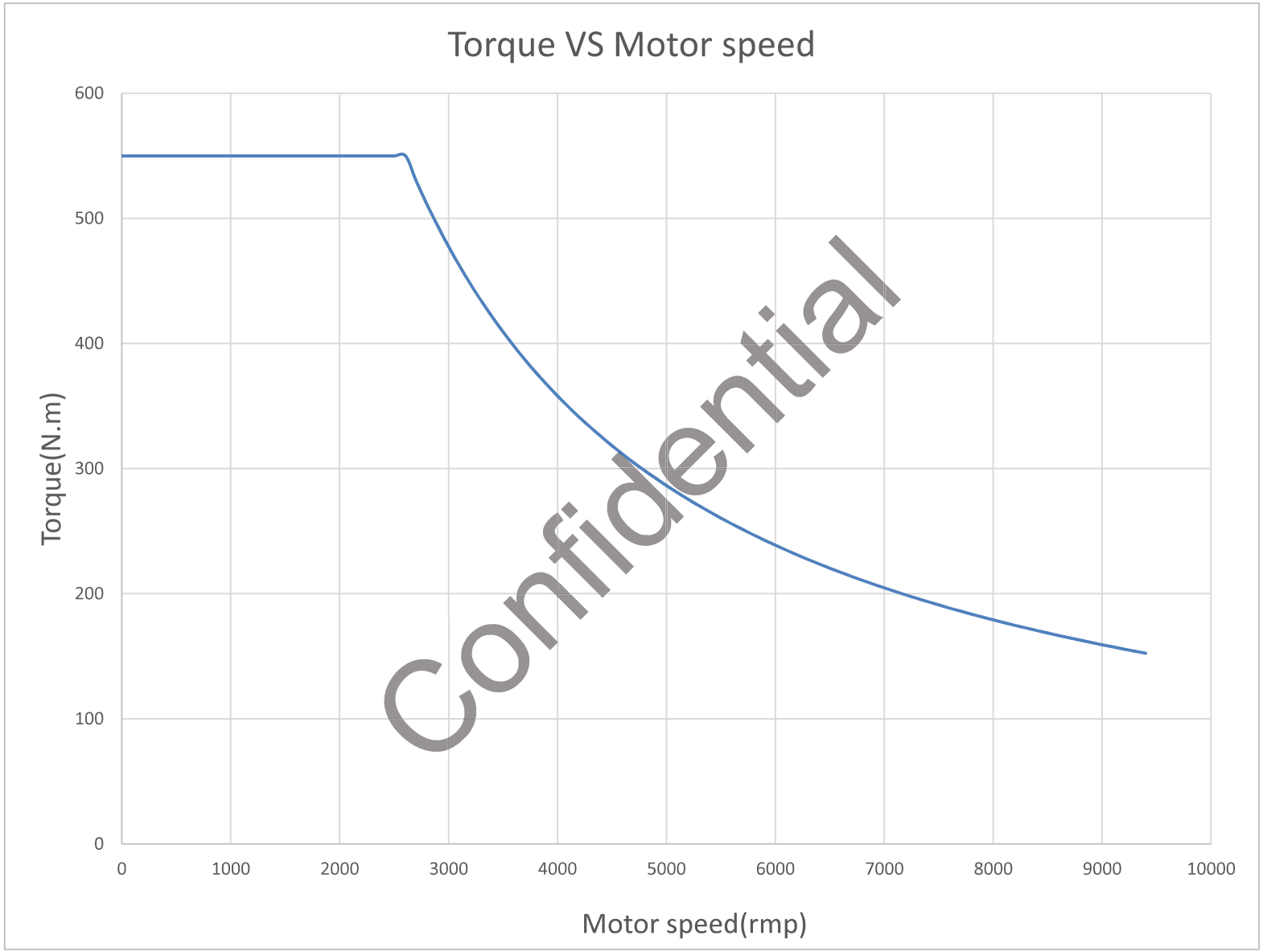


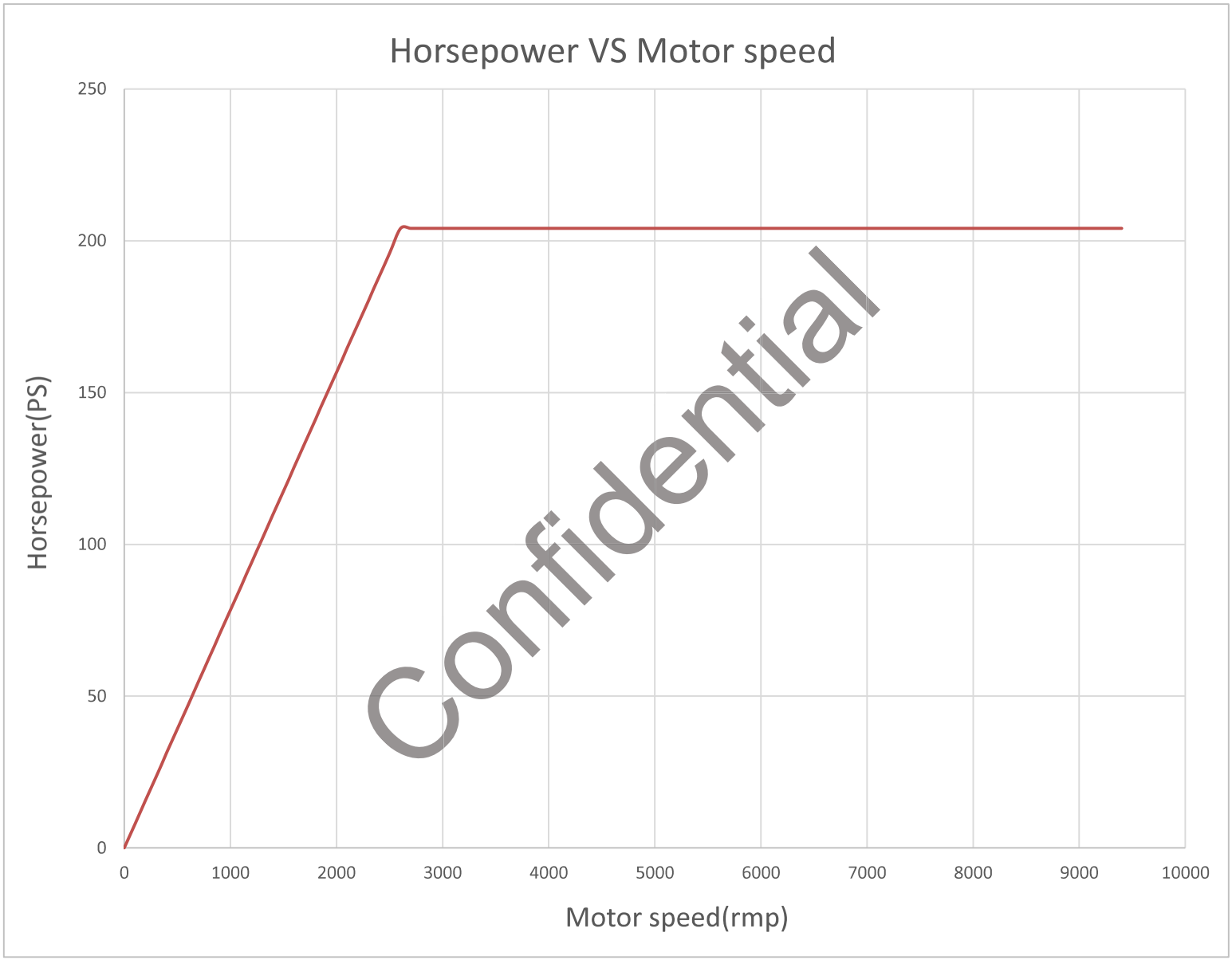
ADDTIONAL COST RELATED INFORMATION

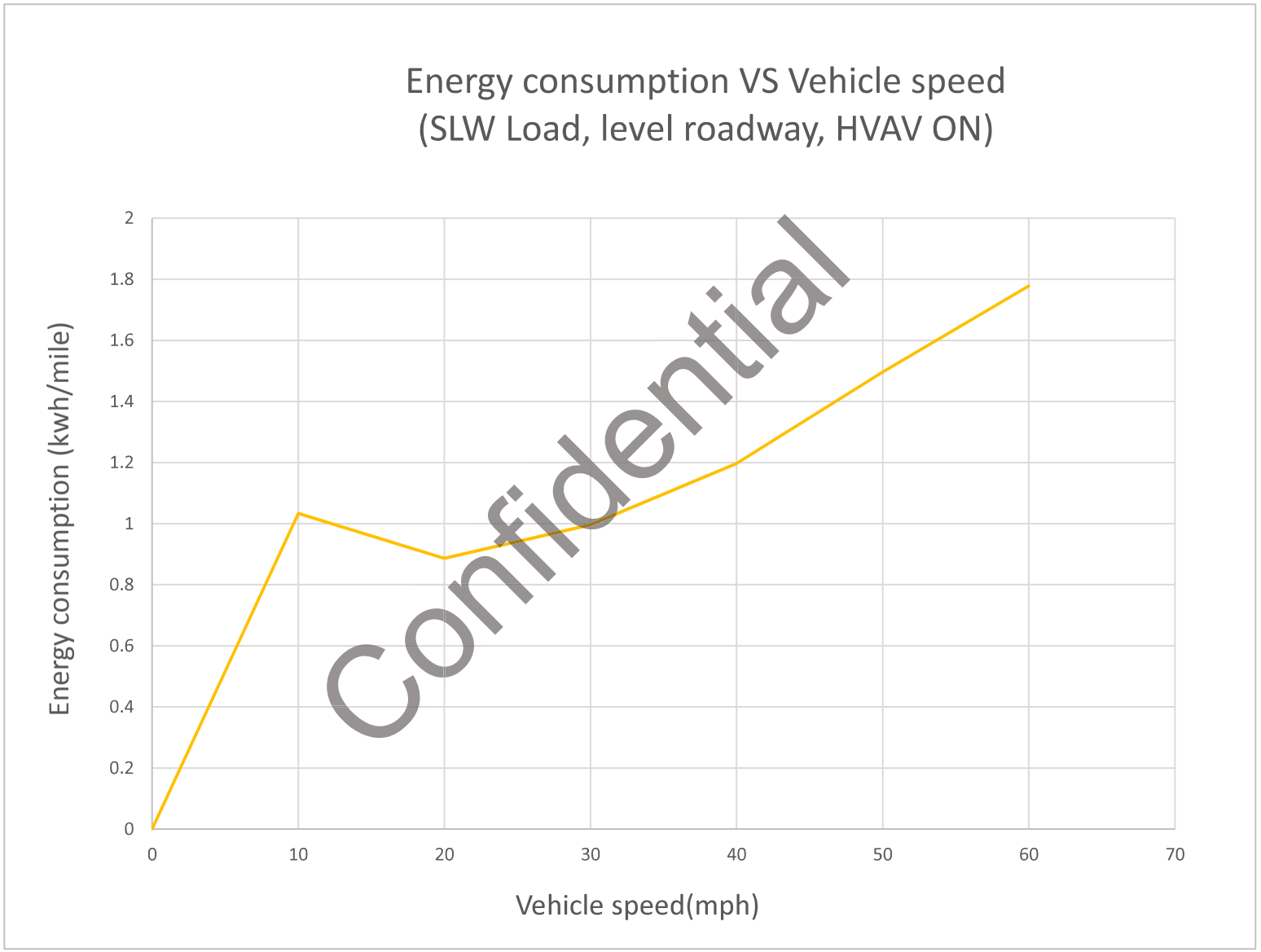
BYD CER 10 ACCELERATION/ DECELERATION SPEED/TIME/ENGERGY GRAPH ATTACHMENT

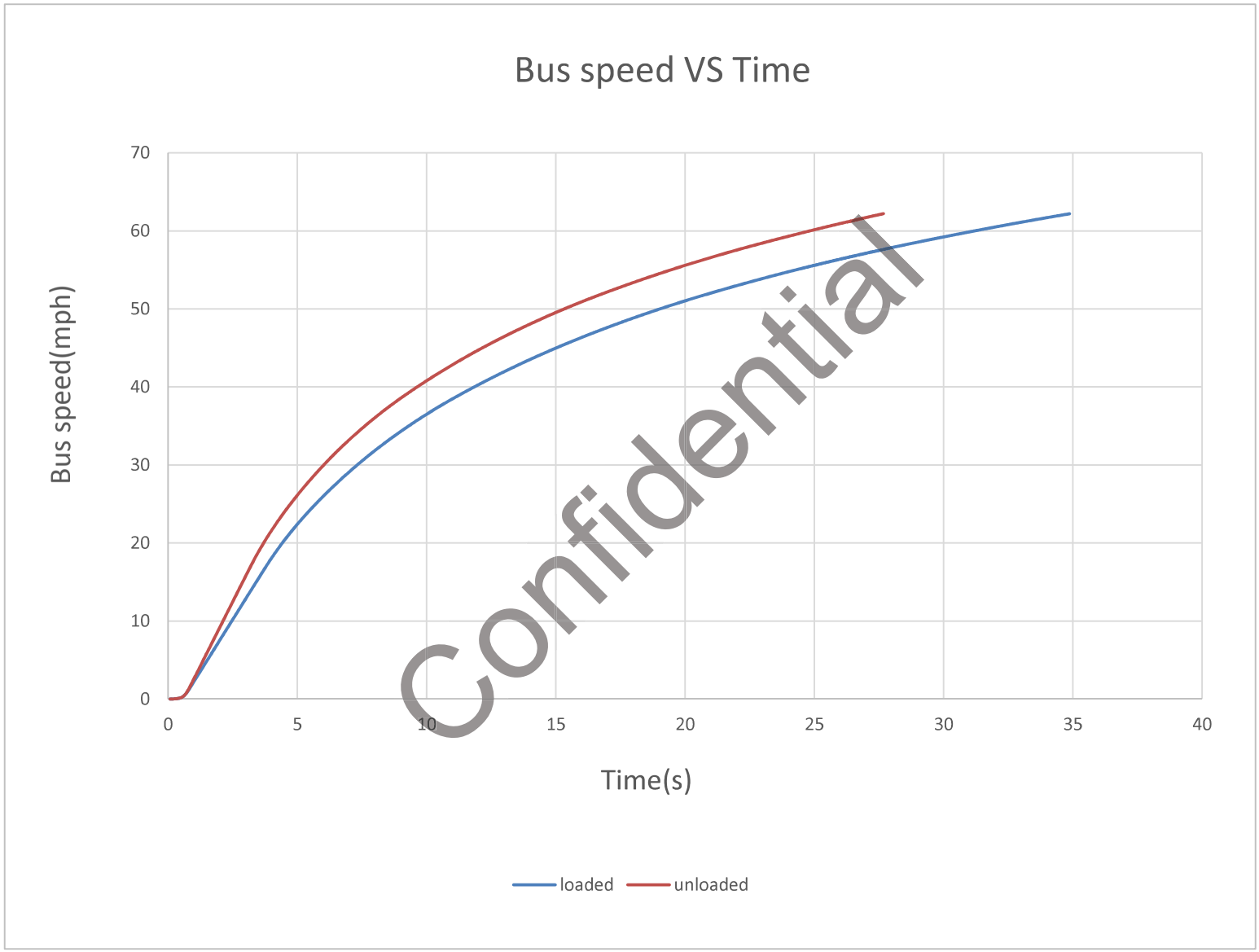
CER 10 VEHICLE TECHNICAL QUESTIONNIARE K7MER 30FT

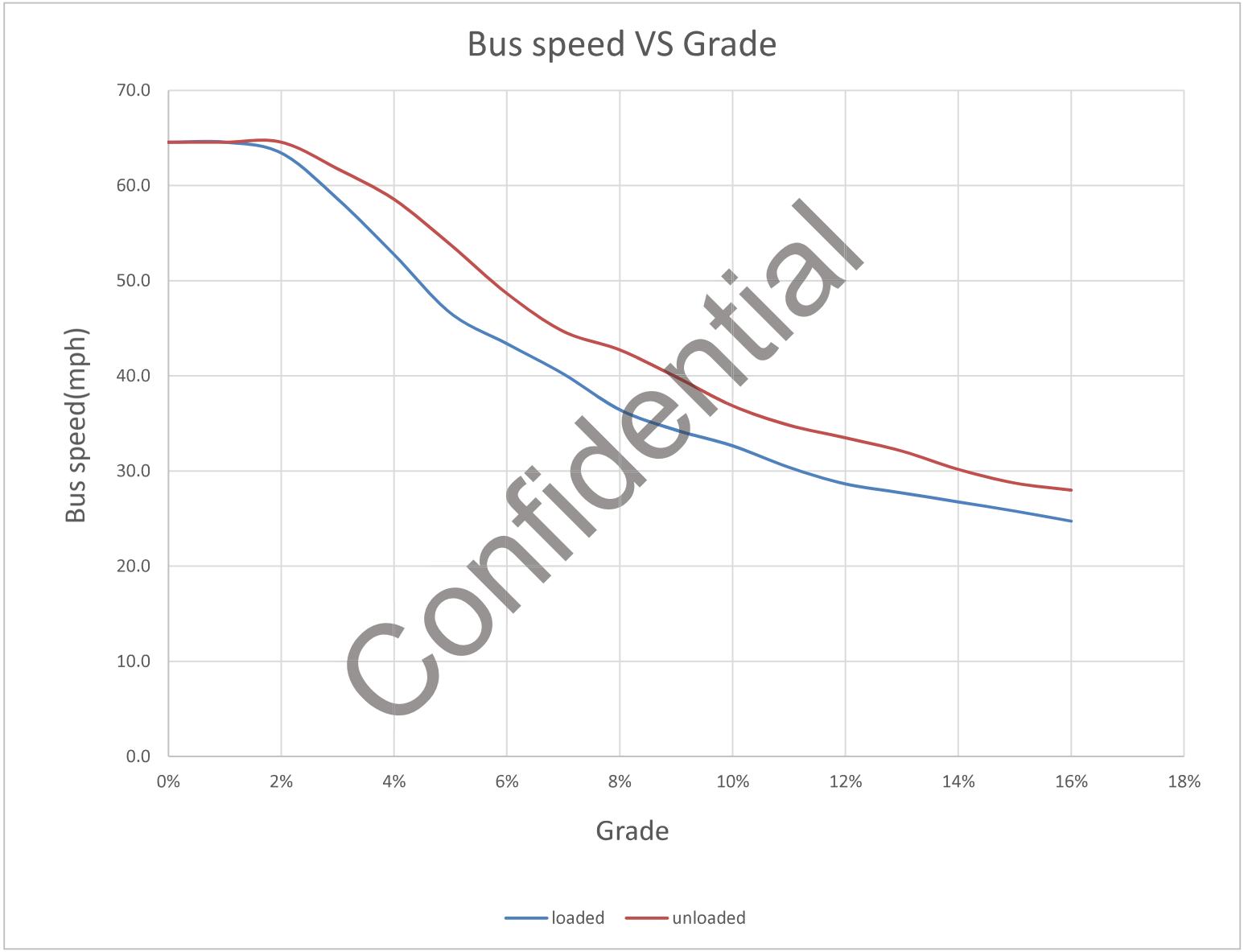

Motor speed VS Road speed
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Road speed(mph)
0
2000
4000
6000
8000
10000
12000
Motor speed(rmp)
Confidential

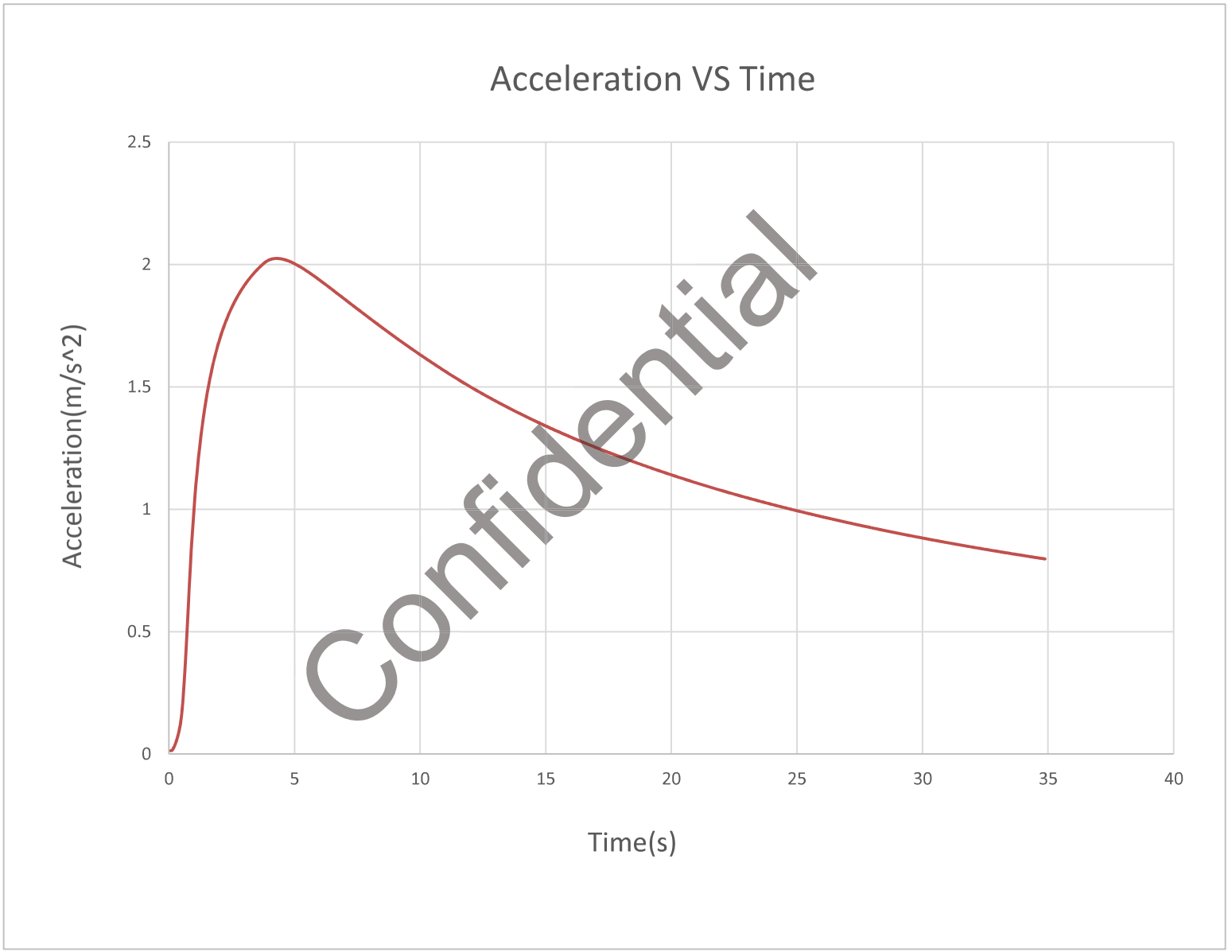

Torque VS Motor speed
600
500
400
300
200
100
0
Torque(N.m)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential

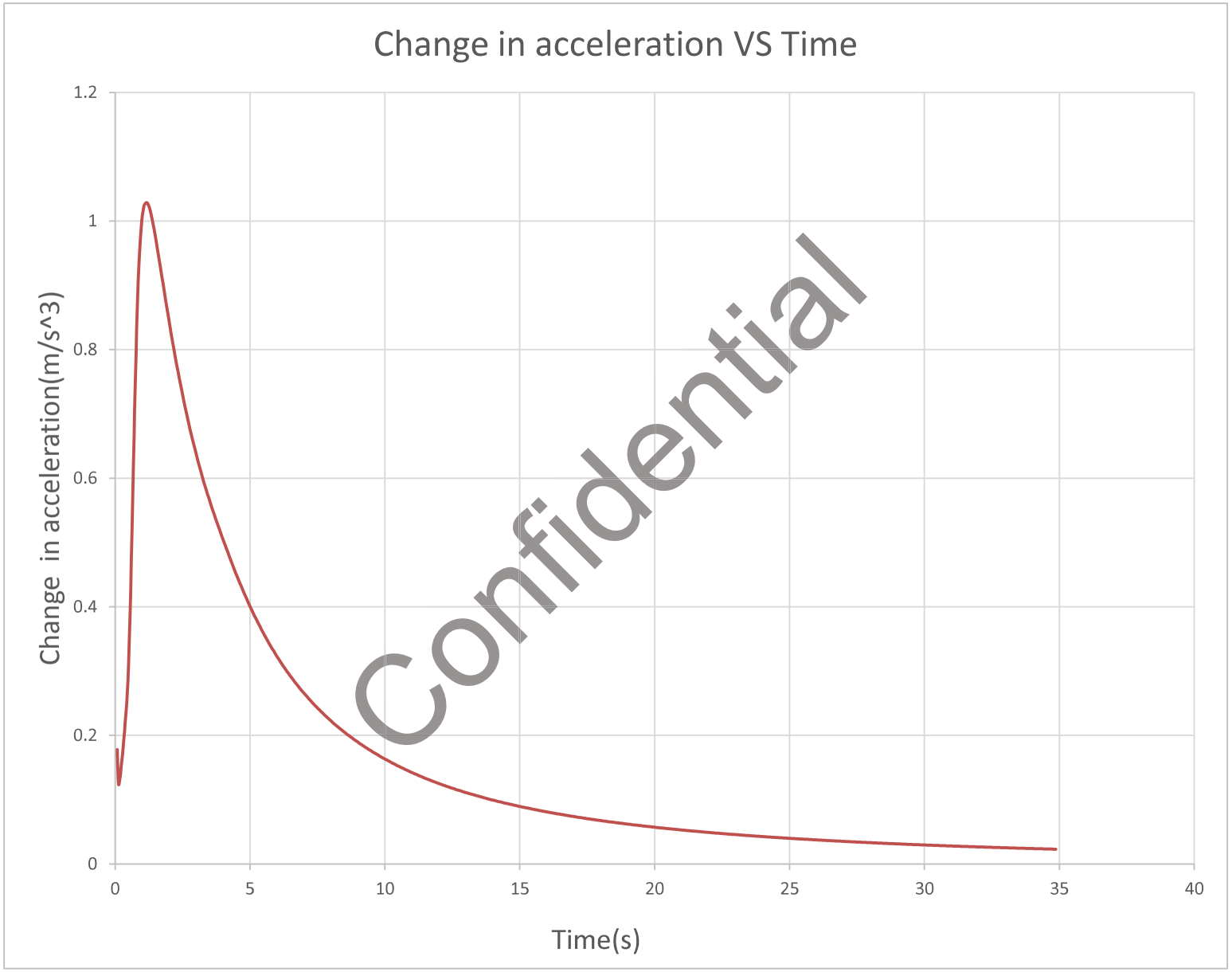

Horsepower VS Motor speed
250
200
150
100
50
0
Horsepower(PS)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Energy consumption VS Vehicle speed
(SLW Load, level roadway, HVAV ON)
Energy consumption (kwh/mile)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
70
Vehicle speed(mph)
Confidential

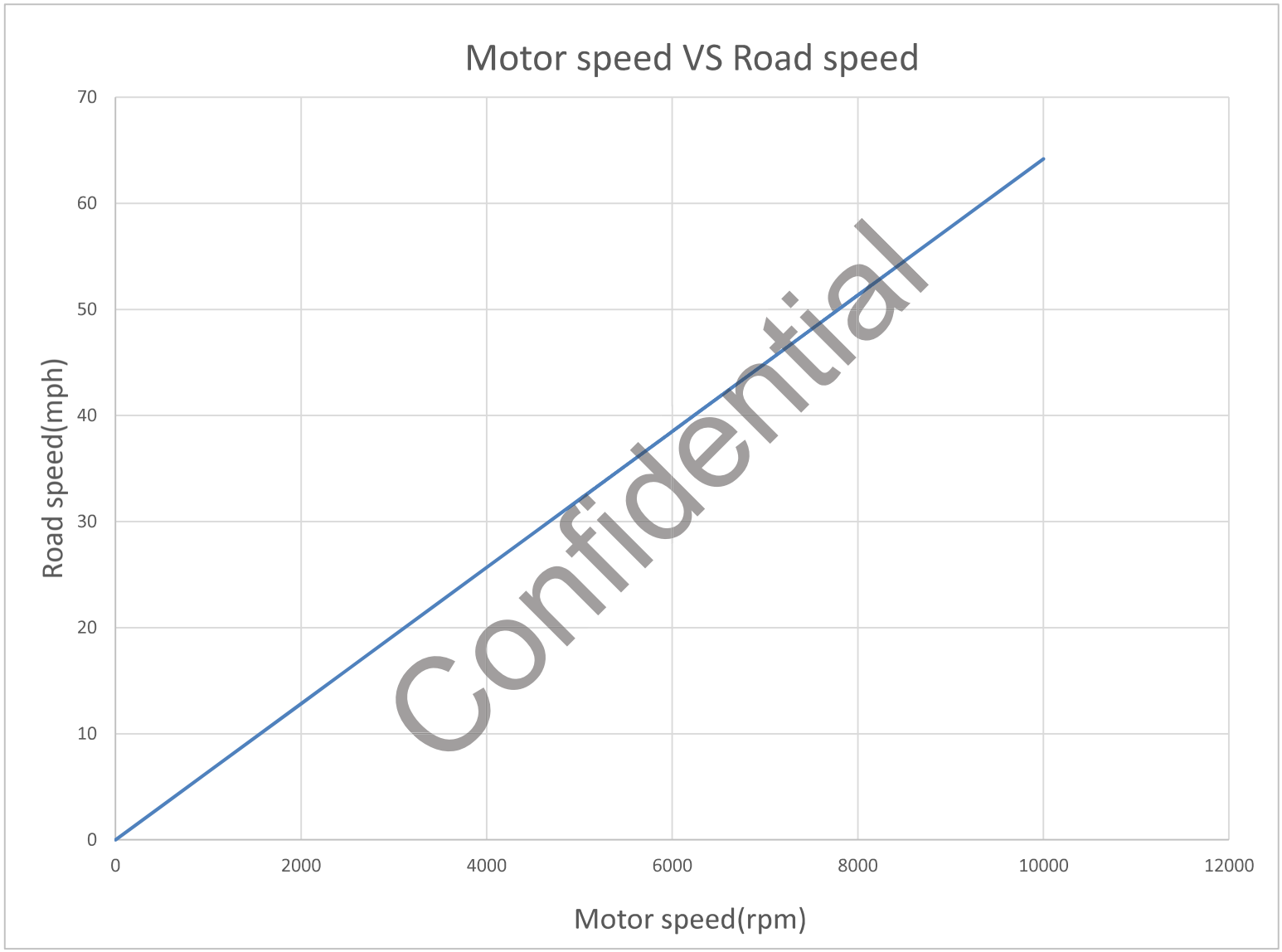

Bus speed VS Time
Bus speed(mph)
70
60
50
40
30
20
10
0
0
5
10
15
20
25
30
35
40
Time(s)
loaded
unloaded
Confidential

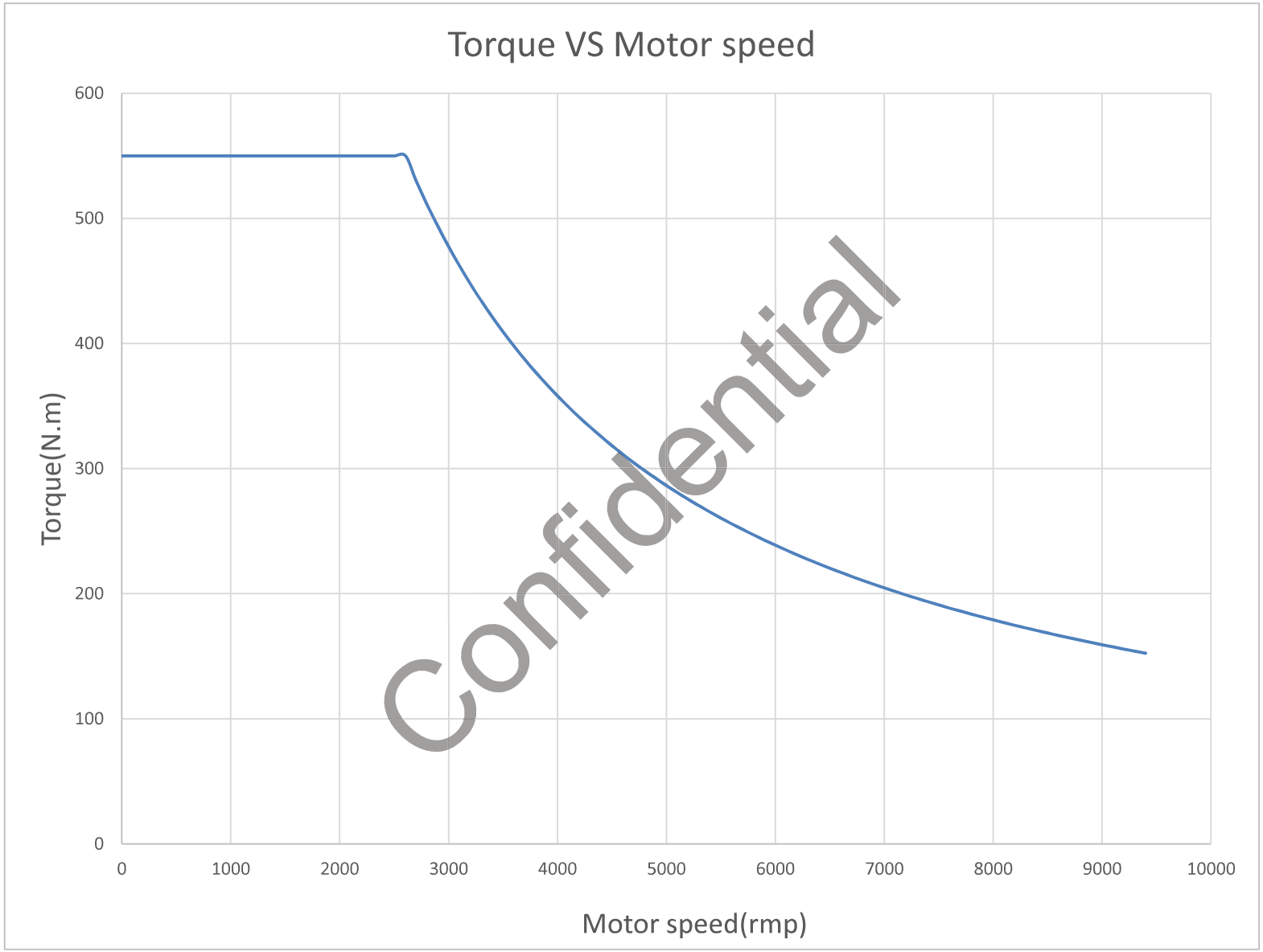

Bus speed VS Grade
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Bus speed(mph)
0%
2%
4%
6%
8%
10%
12%
14%
16%
18%
Grade
loaded
unloaded
Confidential

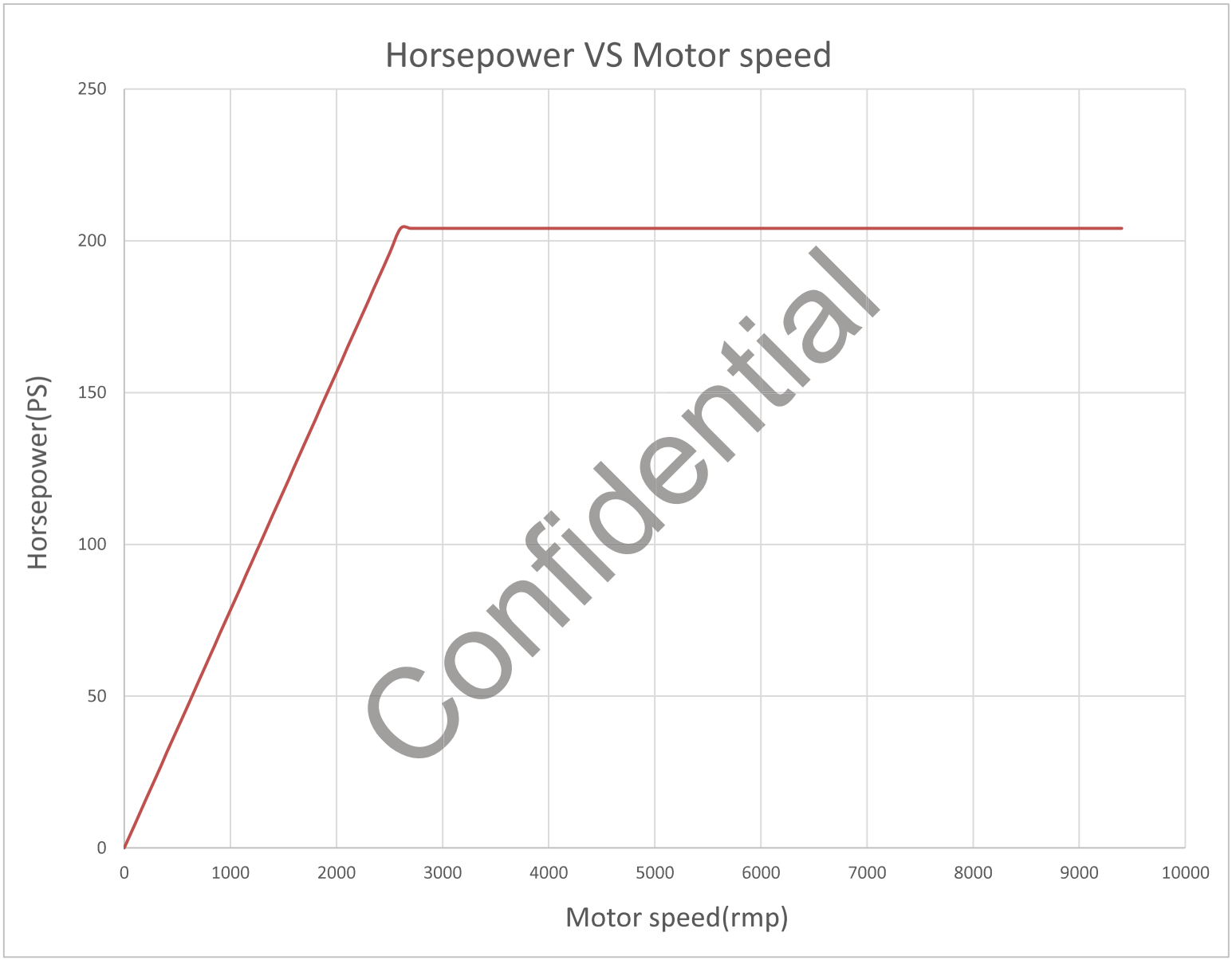

Acceleration VS Time
Acceleration(m/s^2)
2.5
2
1.5
1
0.5
0
0
5
10
15
20
25
30
35
40
Time(s)
Confidential

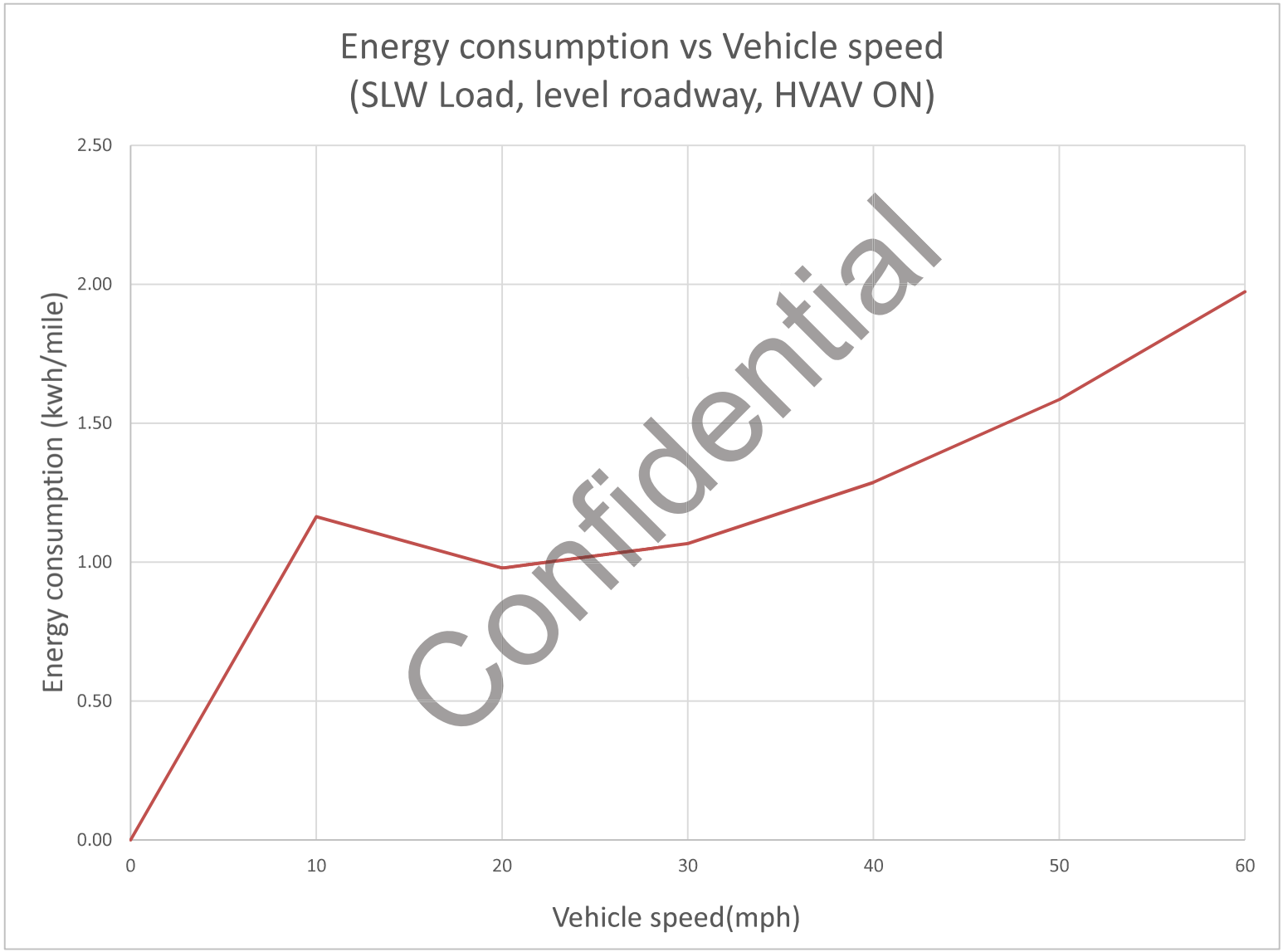

Change in acceleration VS Time
Change in acceleration(m/s^3)
1.2
1
0.8
0.6
0.4
0.2
0
0
5
10
15
20
25
30
35
40
Time(s)
Confidential

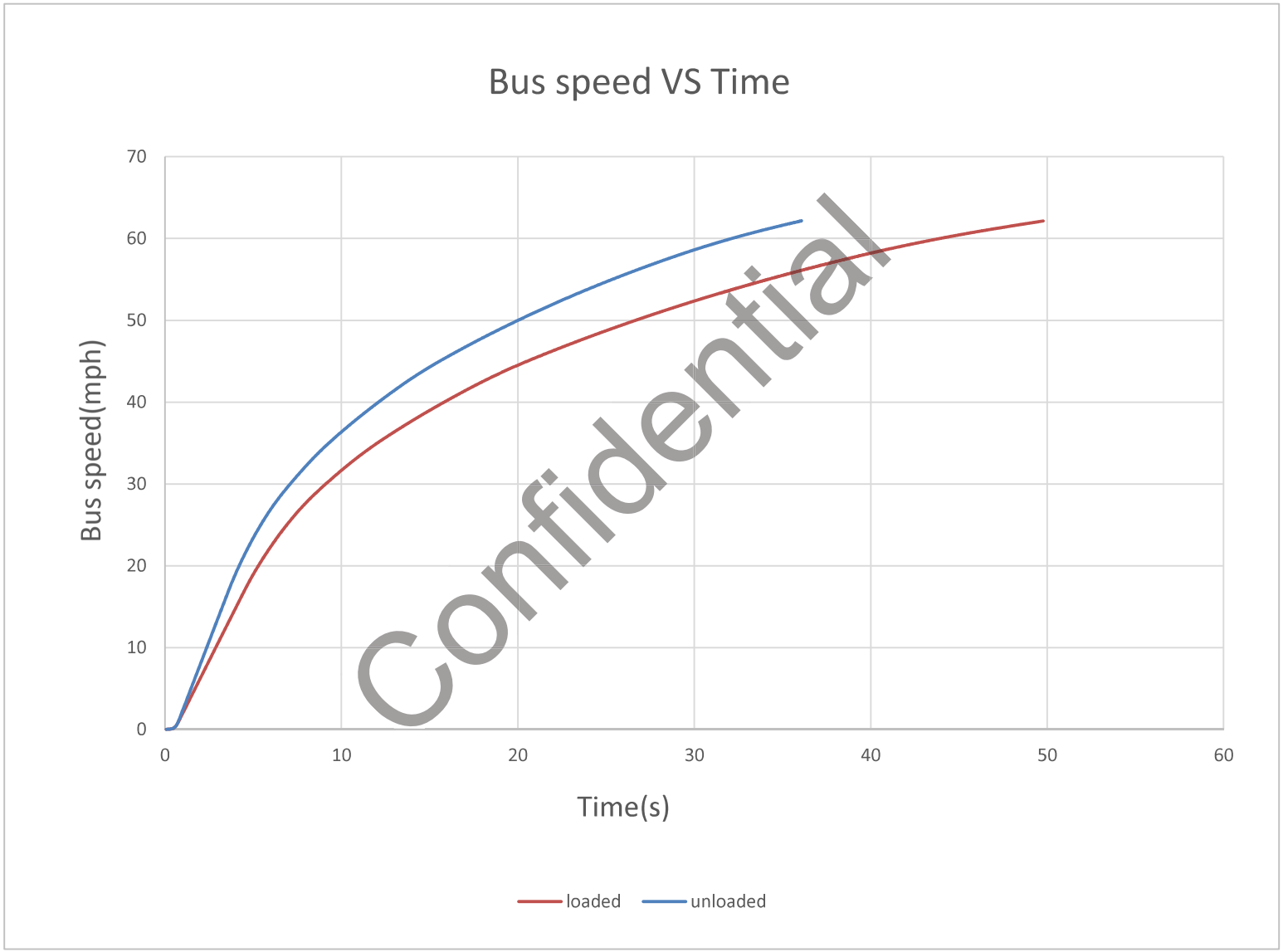
CER 10 VEHICLE TECHNICAL QUESTIONNIARE K8M 35FT

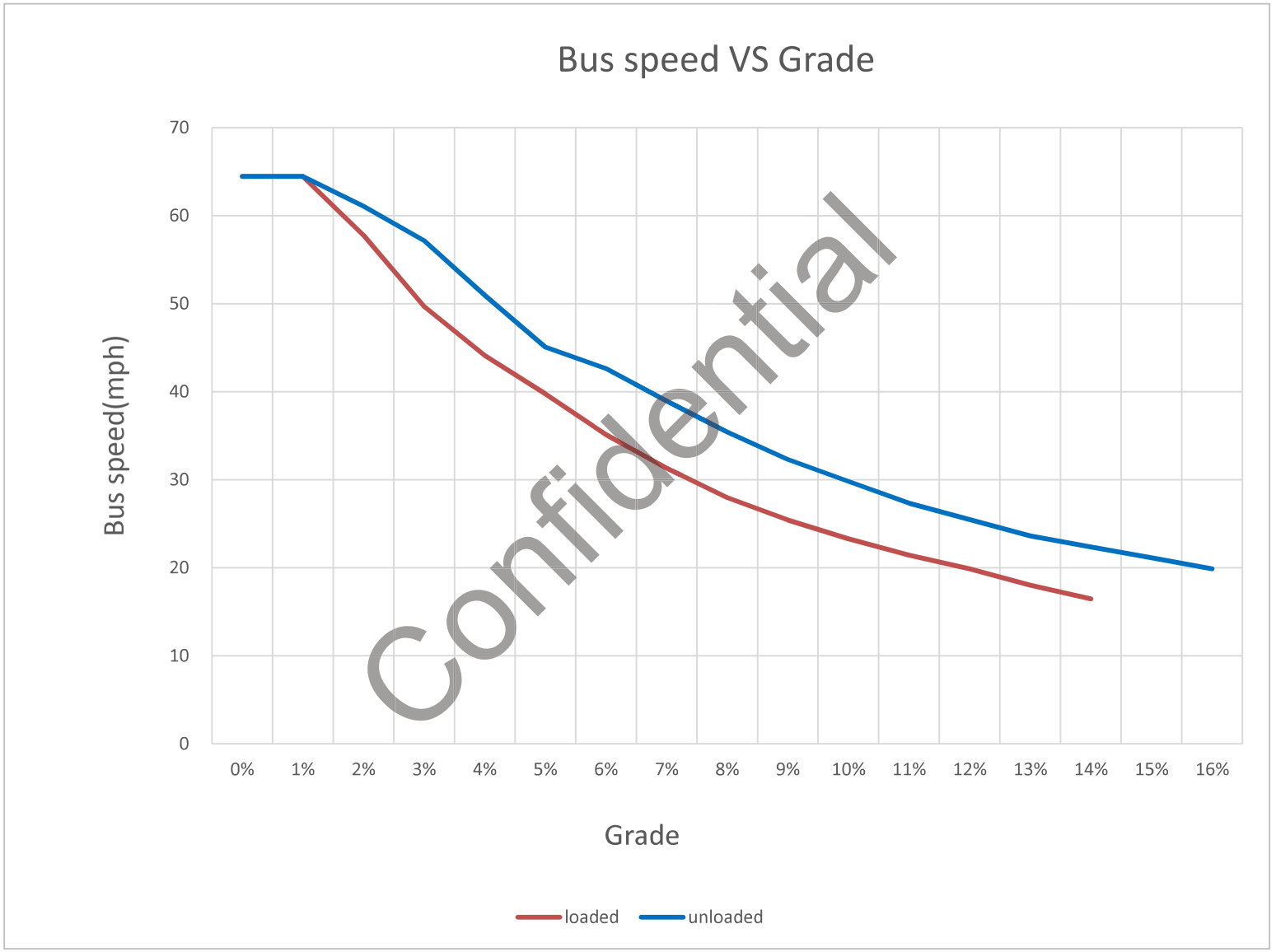

Motor speed VS Road speed
Road speed(mph)
70
60
50
40
30
20
10
0
0
2000
4000
6000
8000
10000
12000
Motor speed(rpm)
Confidential


Torque VS Motor speed
600
500
400
300
200
100
0
Torque(N.m)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Horsepower VS Motor speed
250
200
150
100
50
0
Horsepower(PS)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Energy consumption vs Vehicle speed
(SLW Load, level roadway, HVAV ON)
Energy consumption (kwh/mile)
2.50
2.00
1.50
1.00
0.50
0.00
0
10
20
30
40
50
60
Vehicle speed(mph)
Confidential


Bus speed VS Time
Bus speed(mph)
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
Time(s)
loaded
unloaded
Confidential



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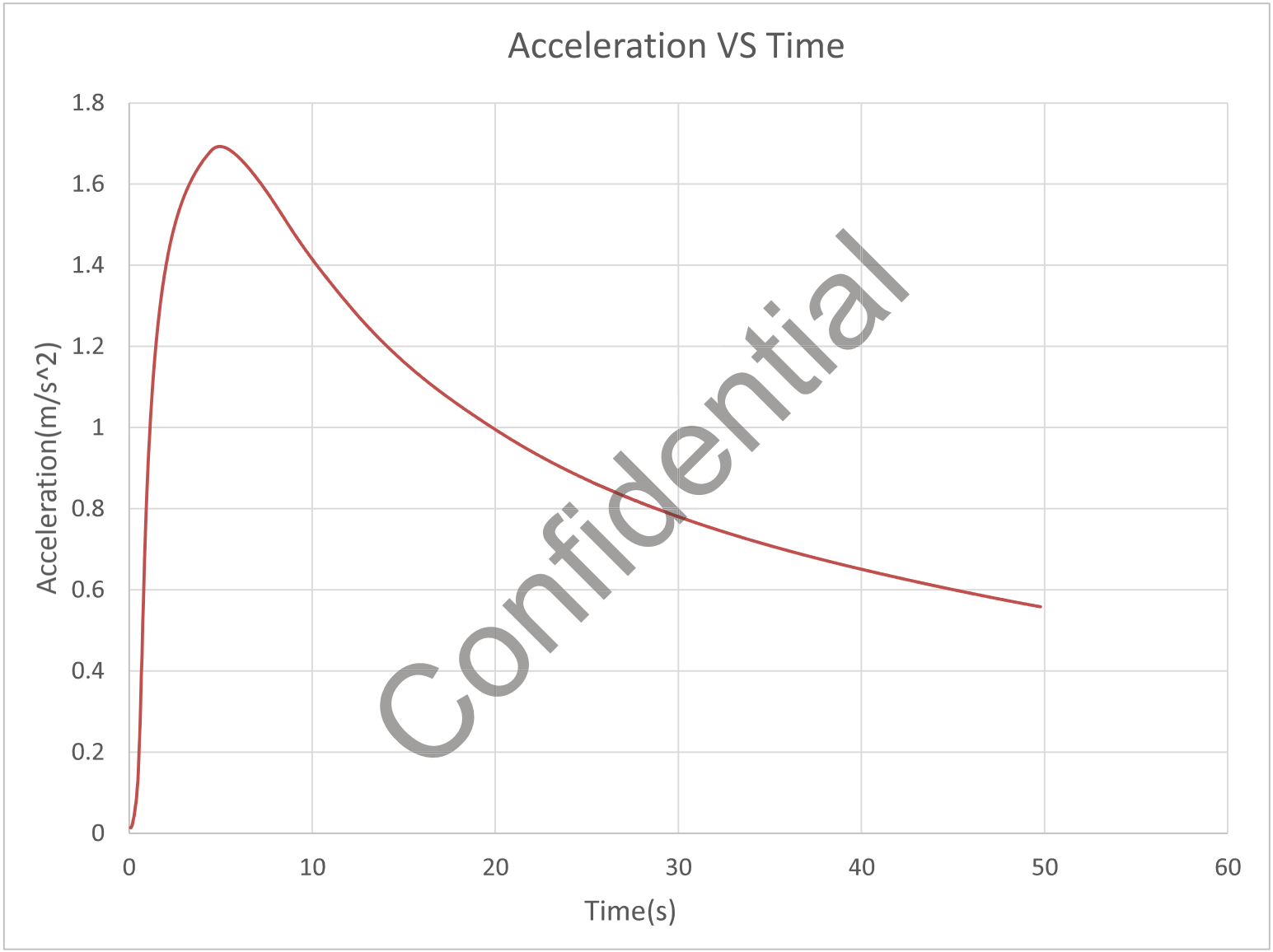
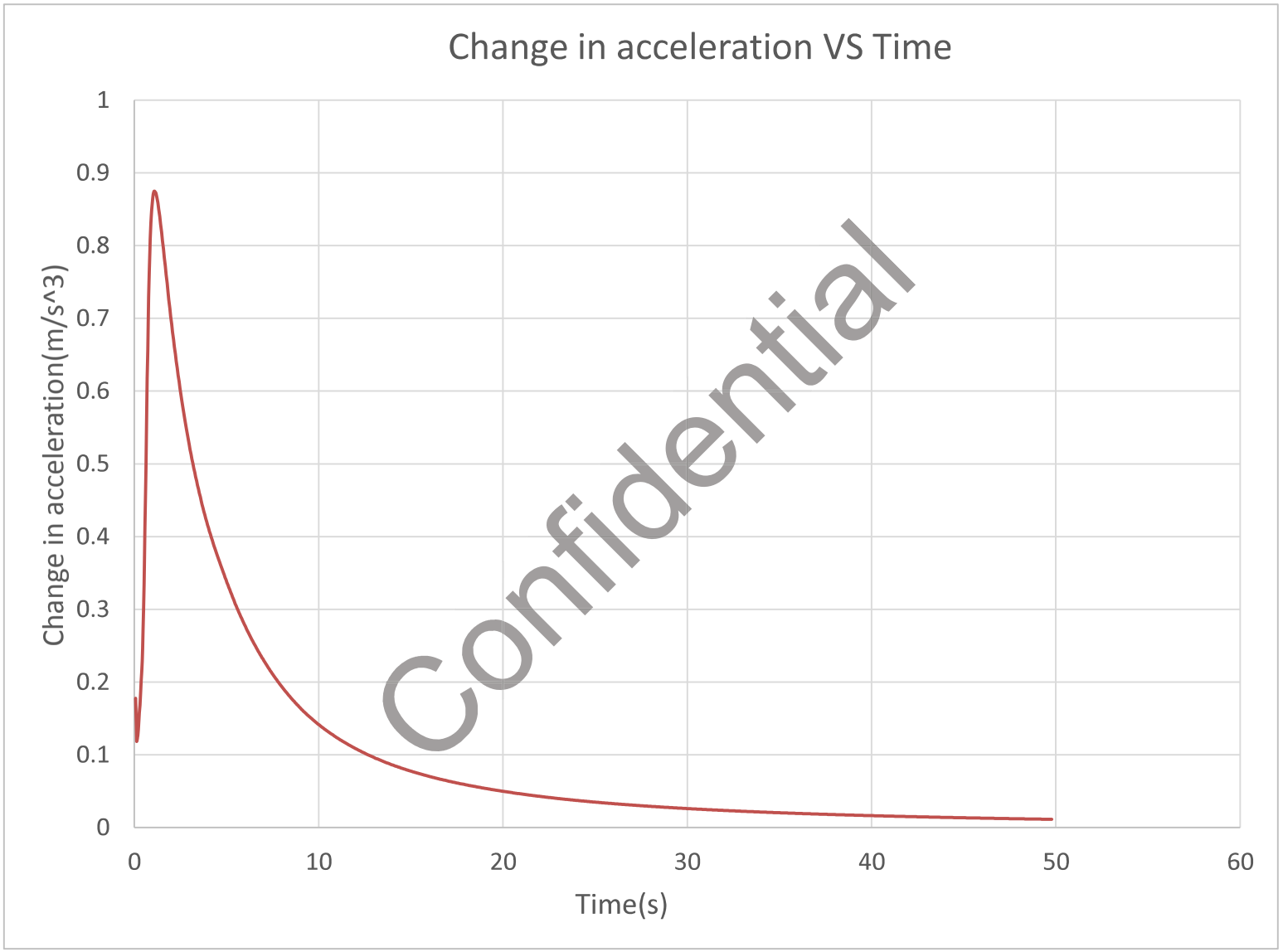
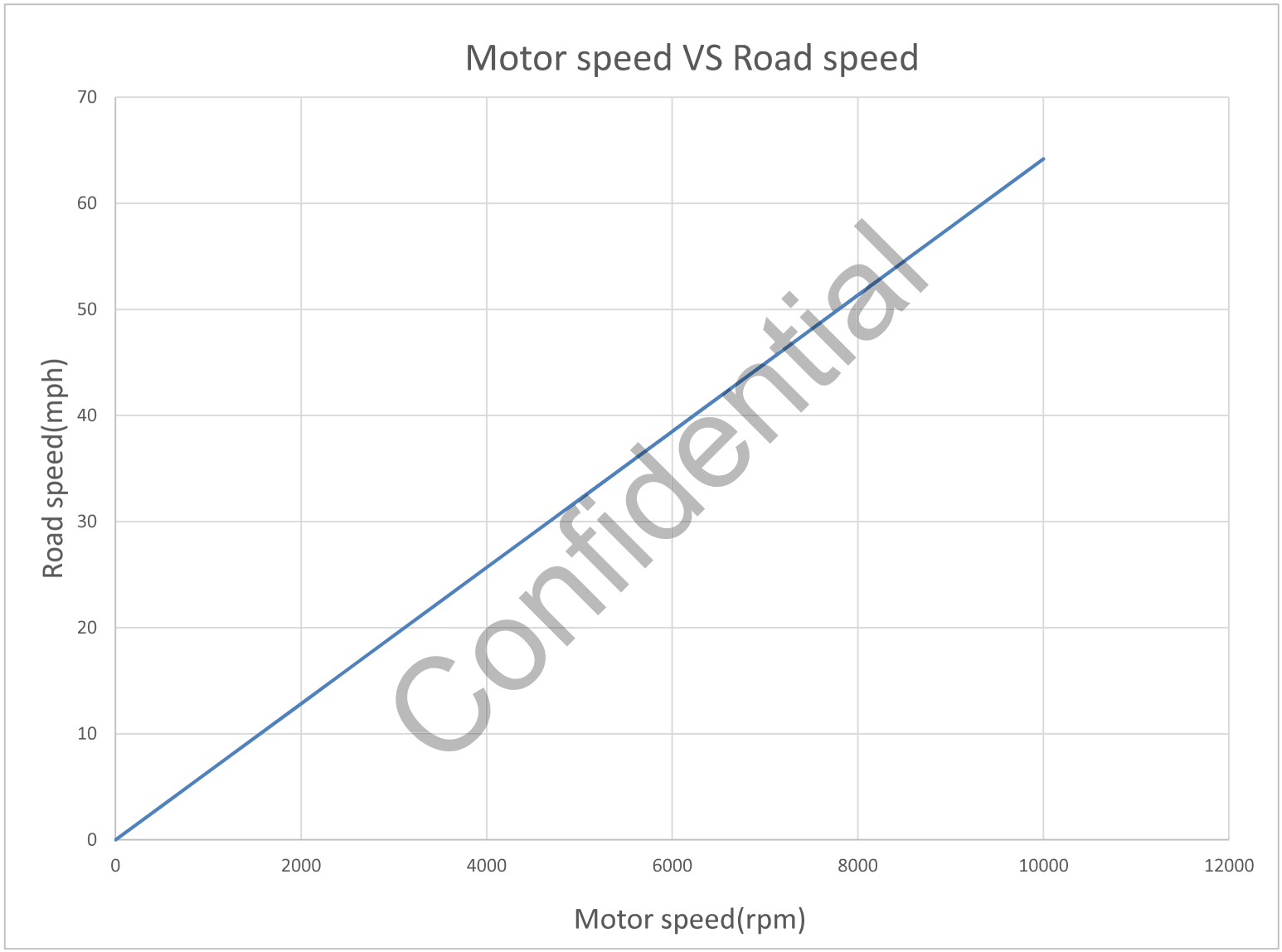
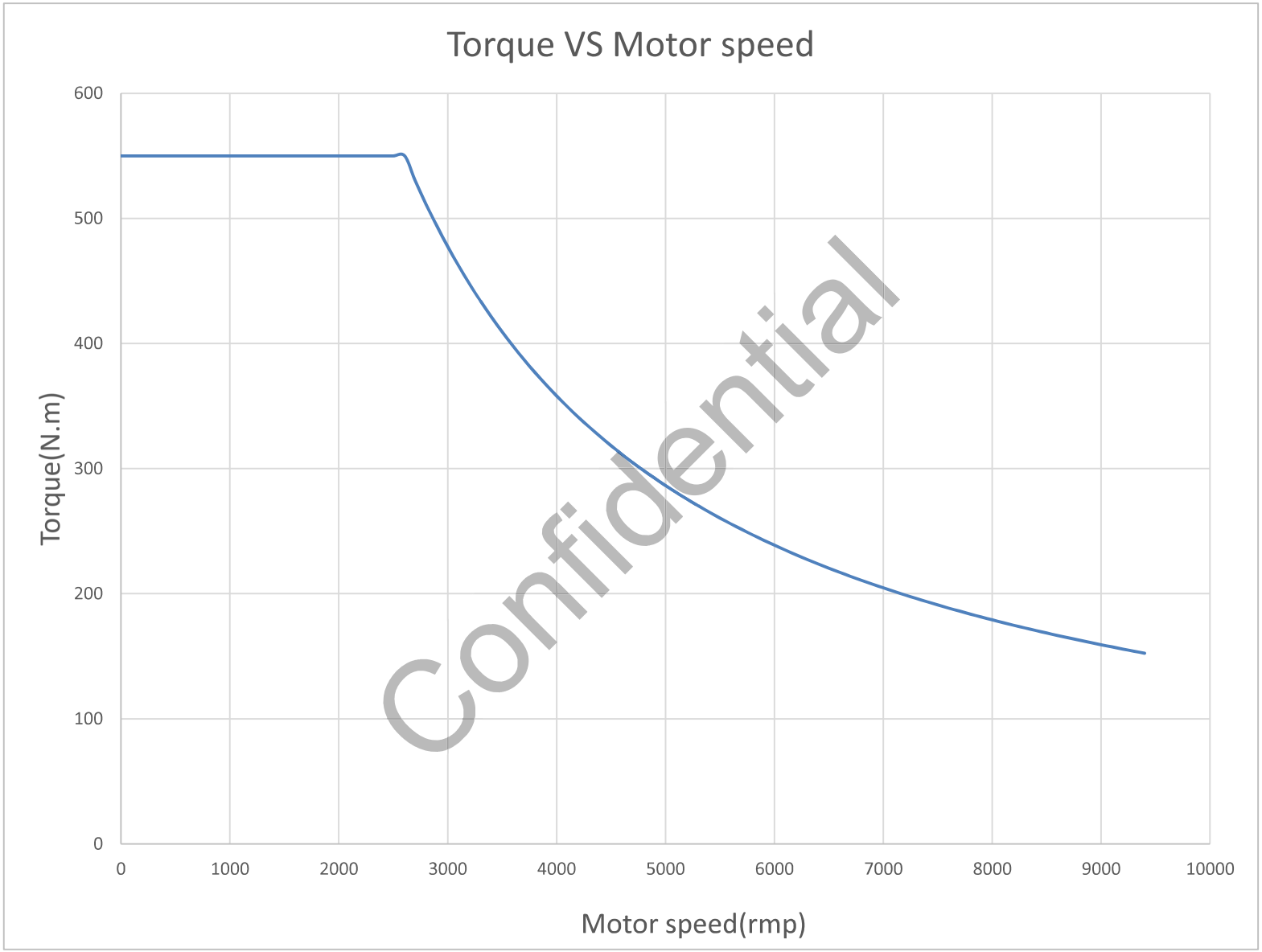
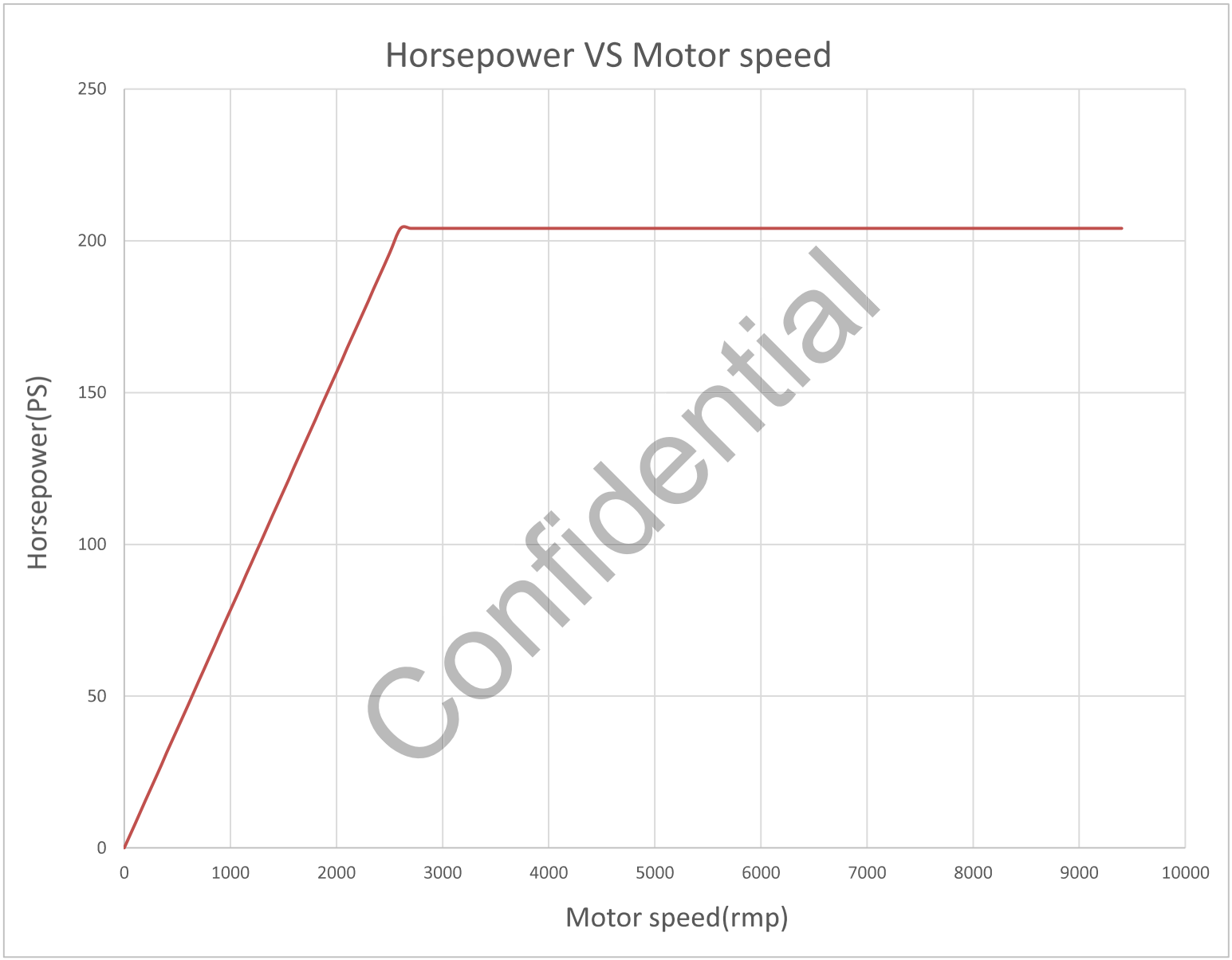

Acceleration VS Time
Acceleration(m/s^2)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
Time(s)
Confidential

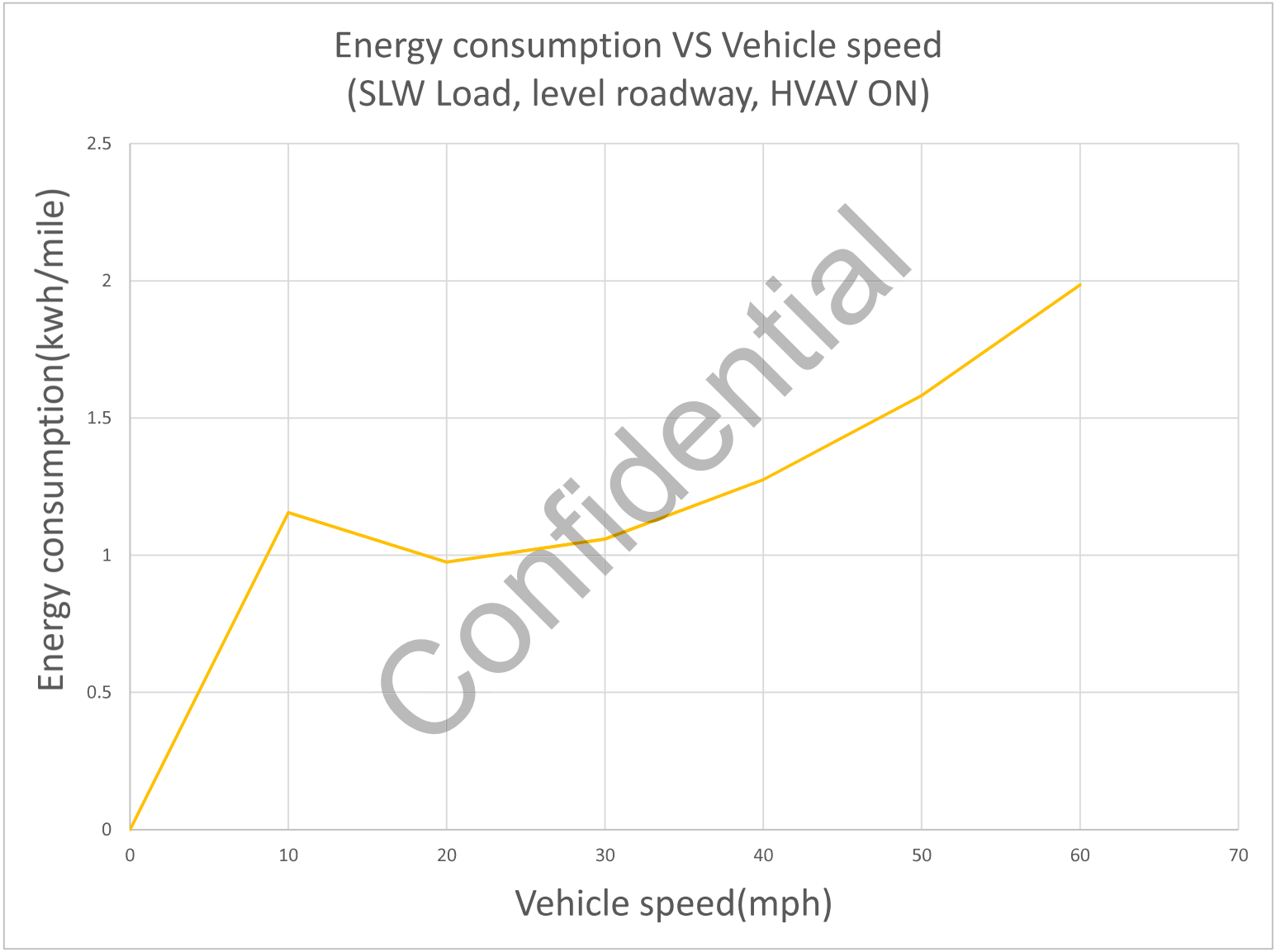

Change in acceleration VS Time
Change in acceleration(m/s^3)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
10
20
30
40
50
60
Time(s)
Confidential

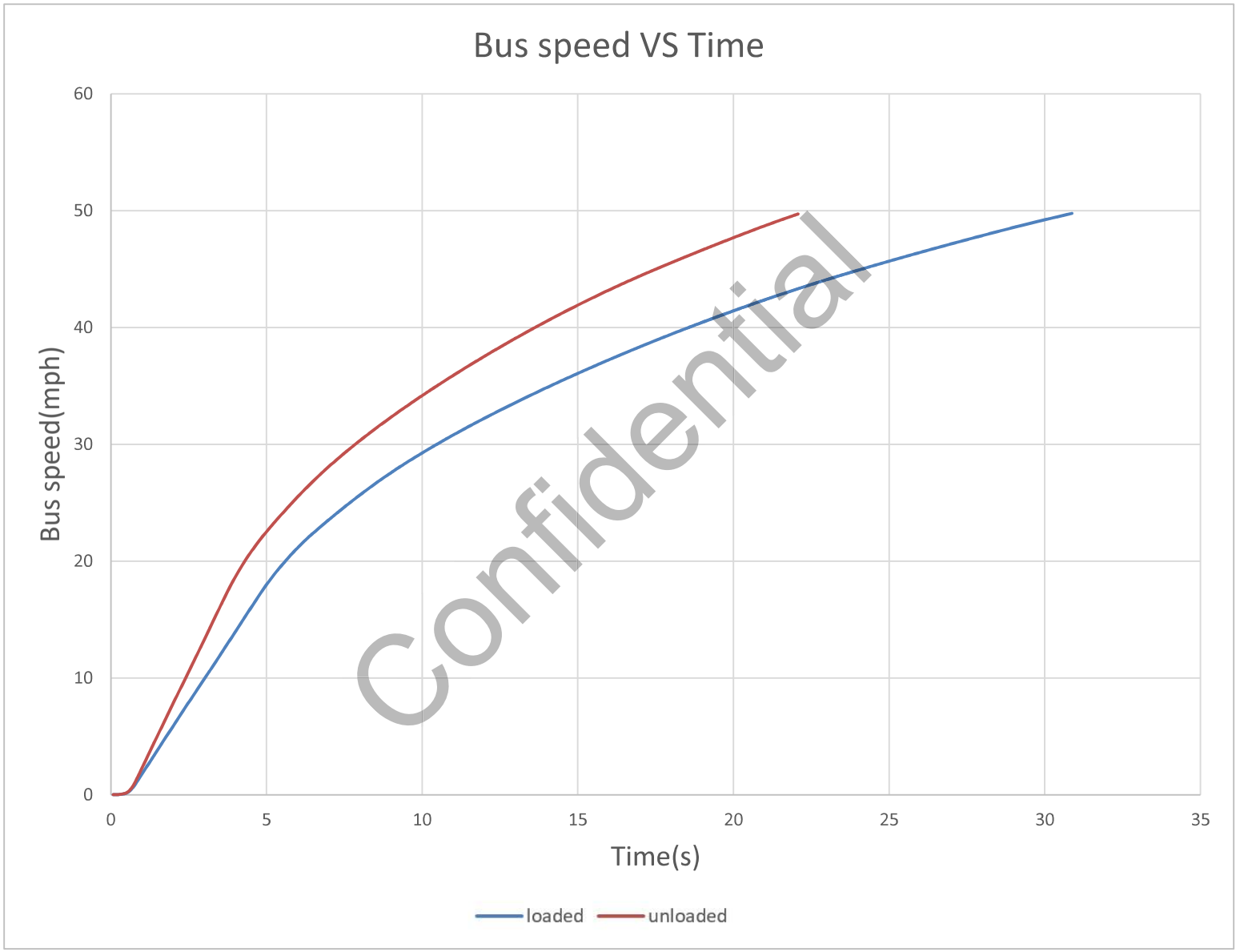
CER 10 VEHICLE TECHNICAL QUESTIONNIARE K9M 40FT

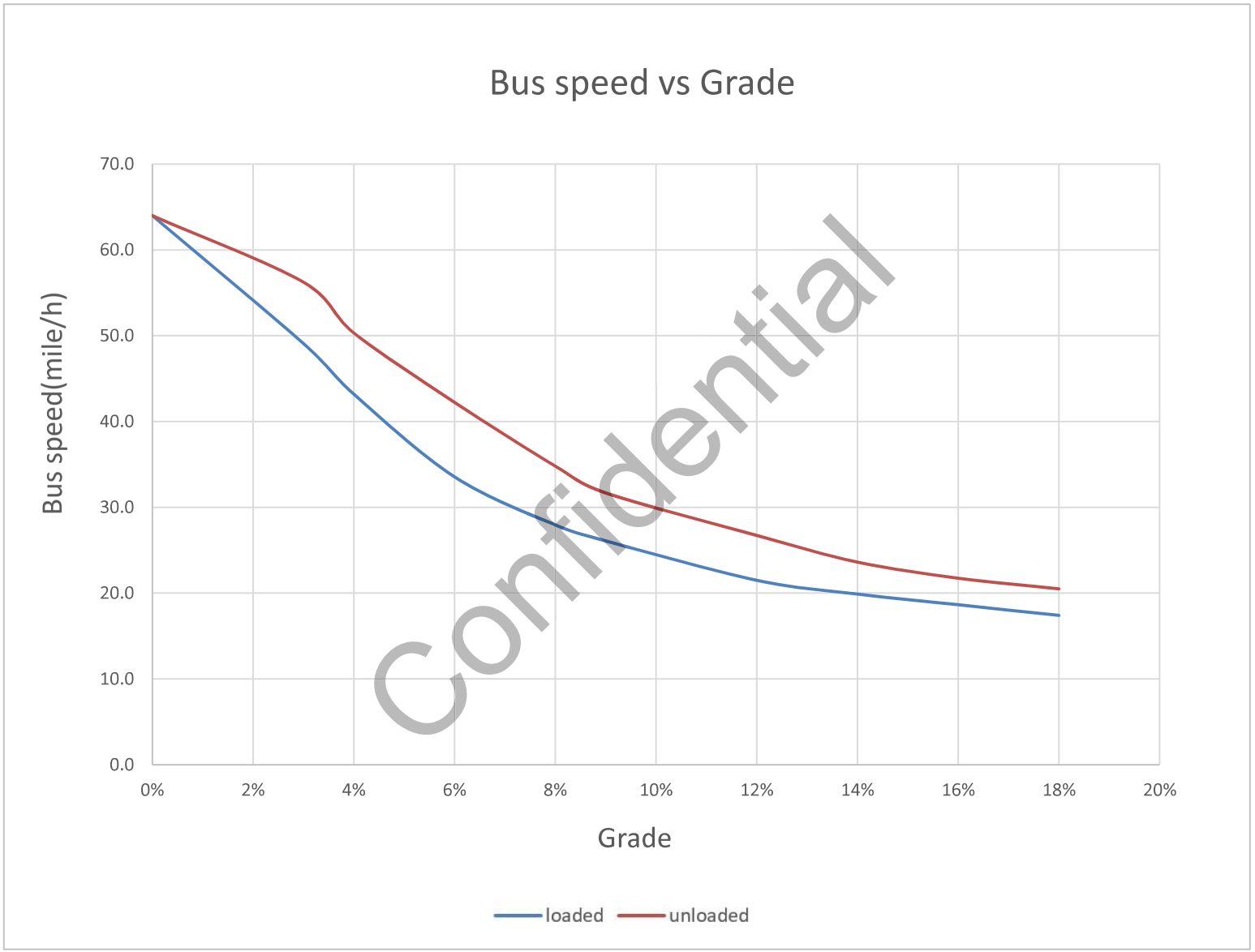

Motor speed VS Road speed
Road speed(mph)
70
60
50
40
30
20
10
0
0
2000
4000
6000
8000
10000
12000
Motor speed(rpm)
Confidential


Torque VS Motor speed
600
500
400
300
200
100
0
Torque(N.m)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Horsepower VS Motor speed
250
200
150
100
50
0
Horsepower(PS)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Energy consumption VS Vehicle speed
(SLW Load, level roadway, HVAV ON)
Energy consumption(kwh/mile)
2.5
2
1.5
1
0.5
0
0
10
20
30
40
50
60
70
Vehicle speed(mph)
Confidential


Bus speed VS Time
Bus speed(mph)
60
50
40
30
20
10
0
0
5
10
15
20
25
30
35
Time(s)
loaded
unloaded
Confidential



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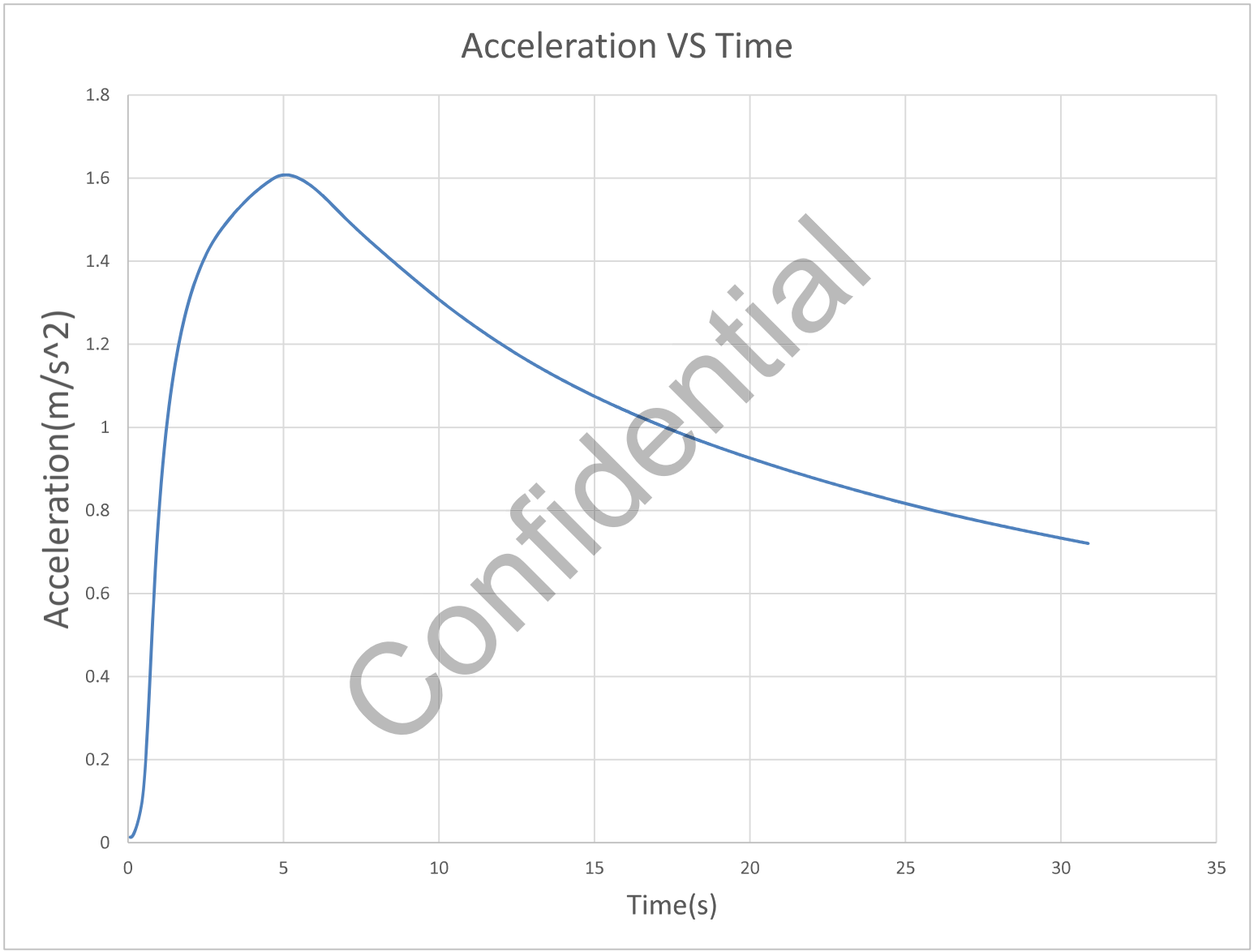
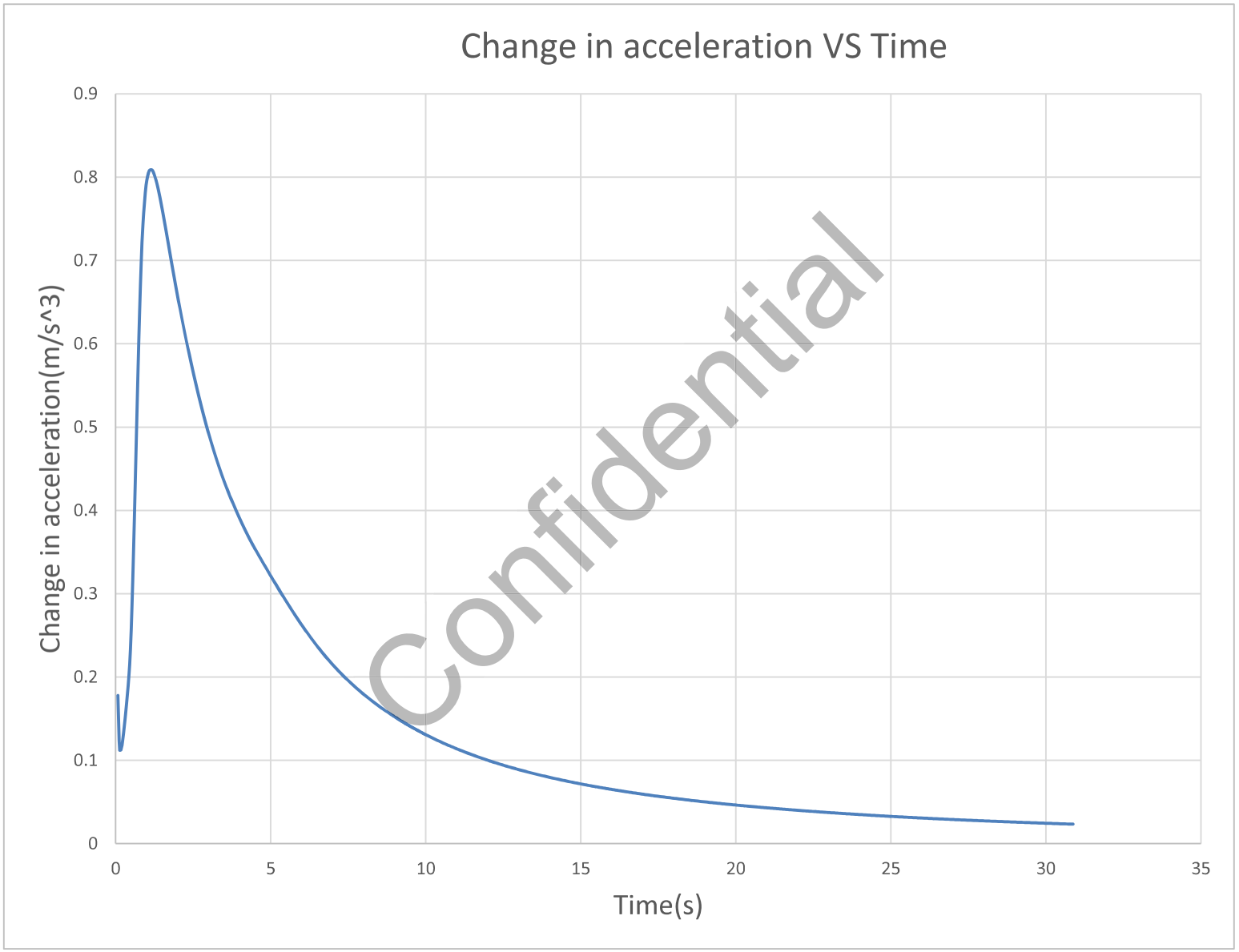
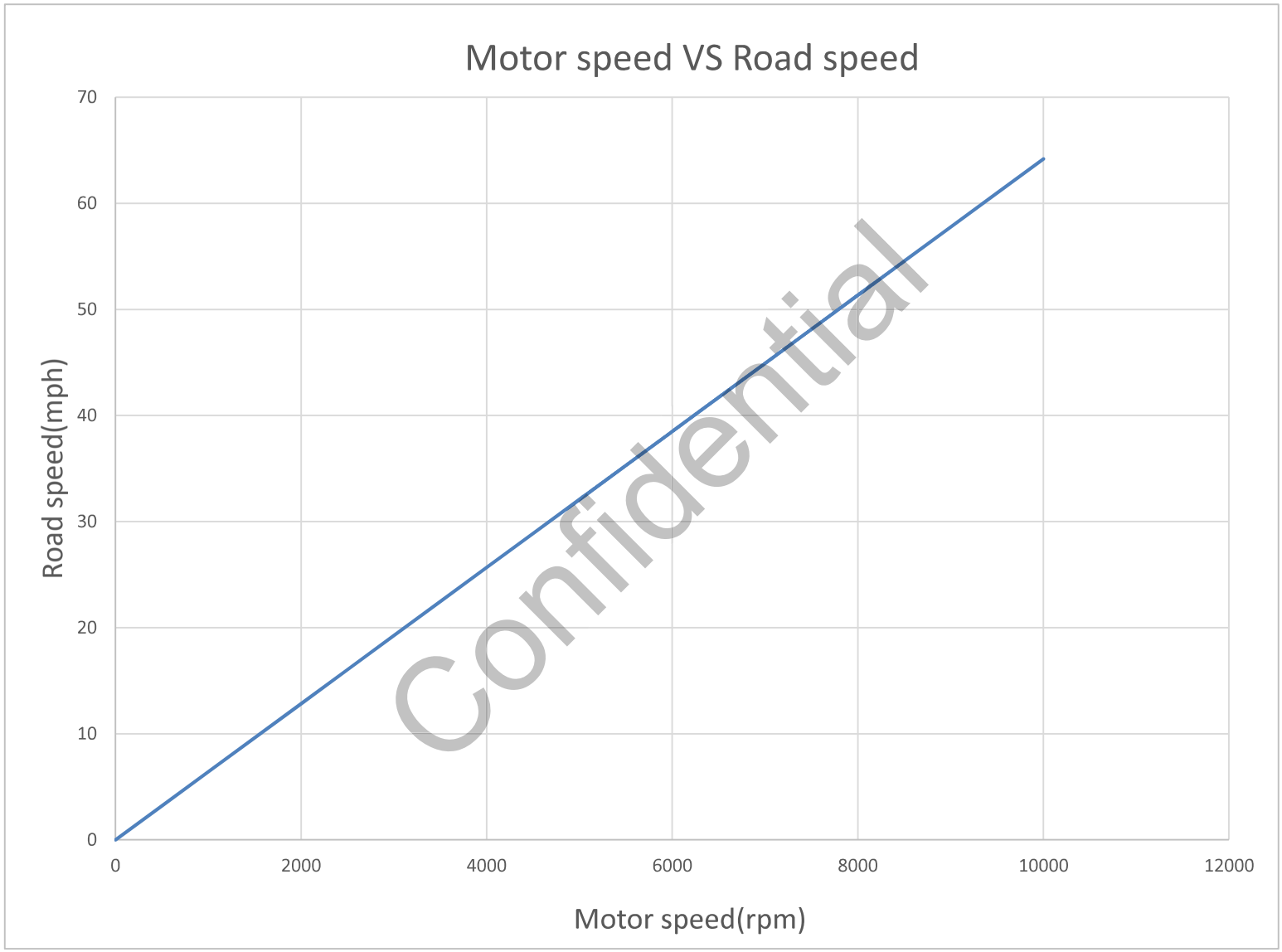
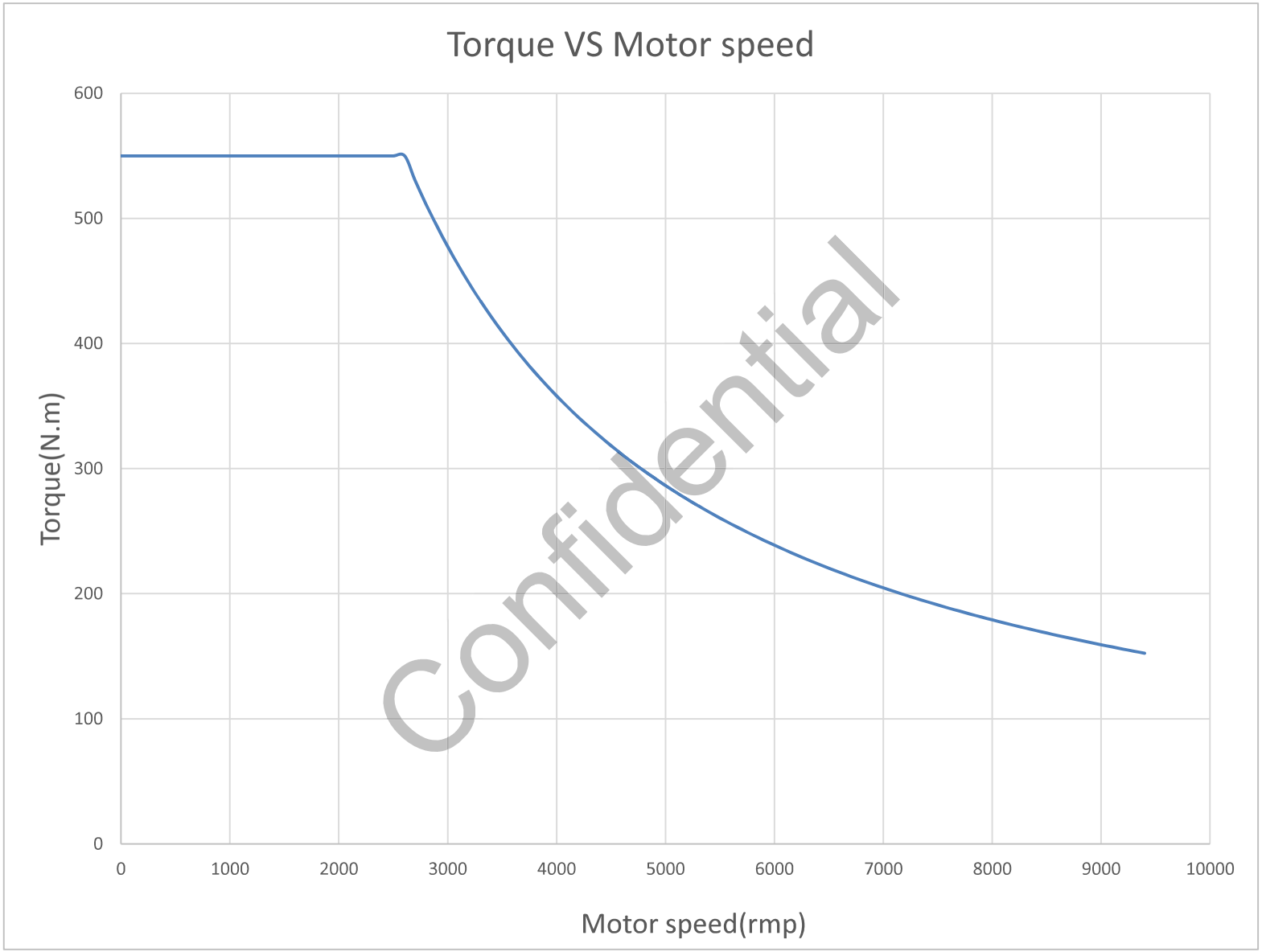
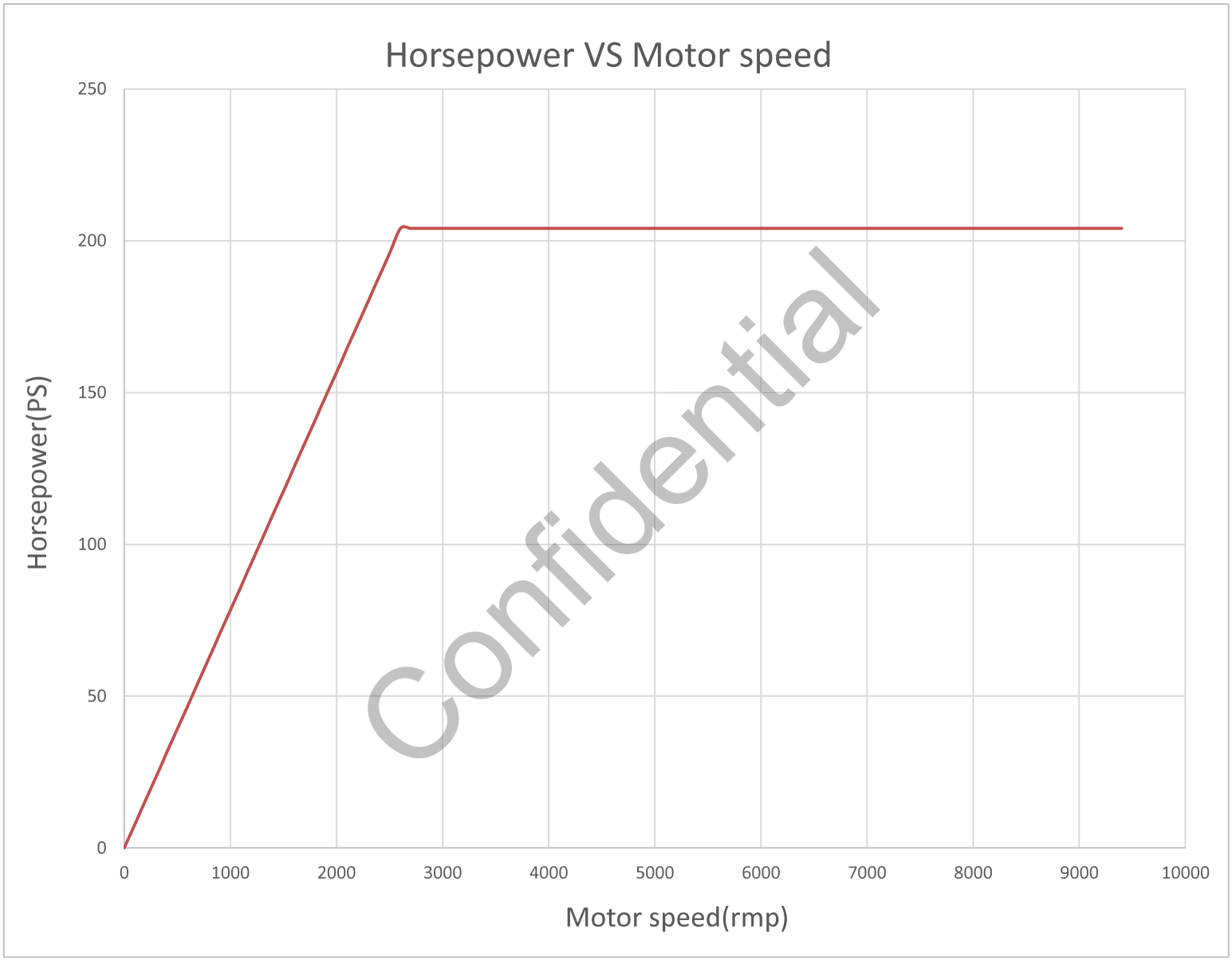

Acceleration VS Time
Acceleration(m/s^2)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
5
10
15
20
25
30
35
Time(s)
Confidential

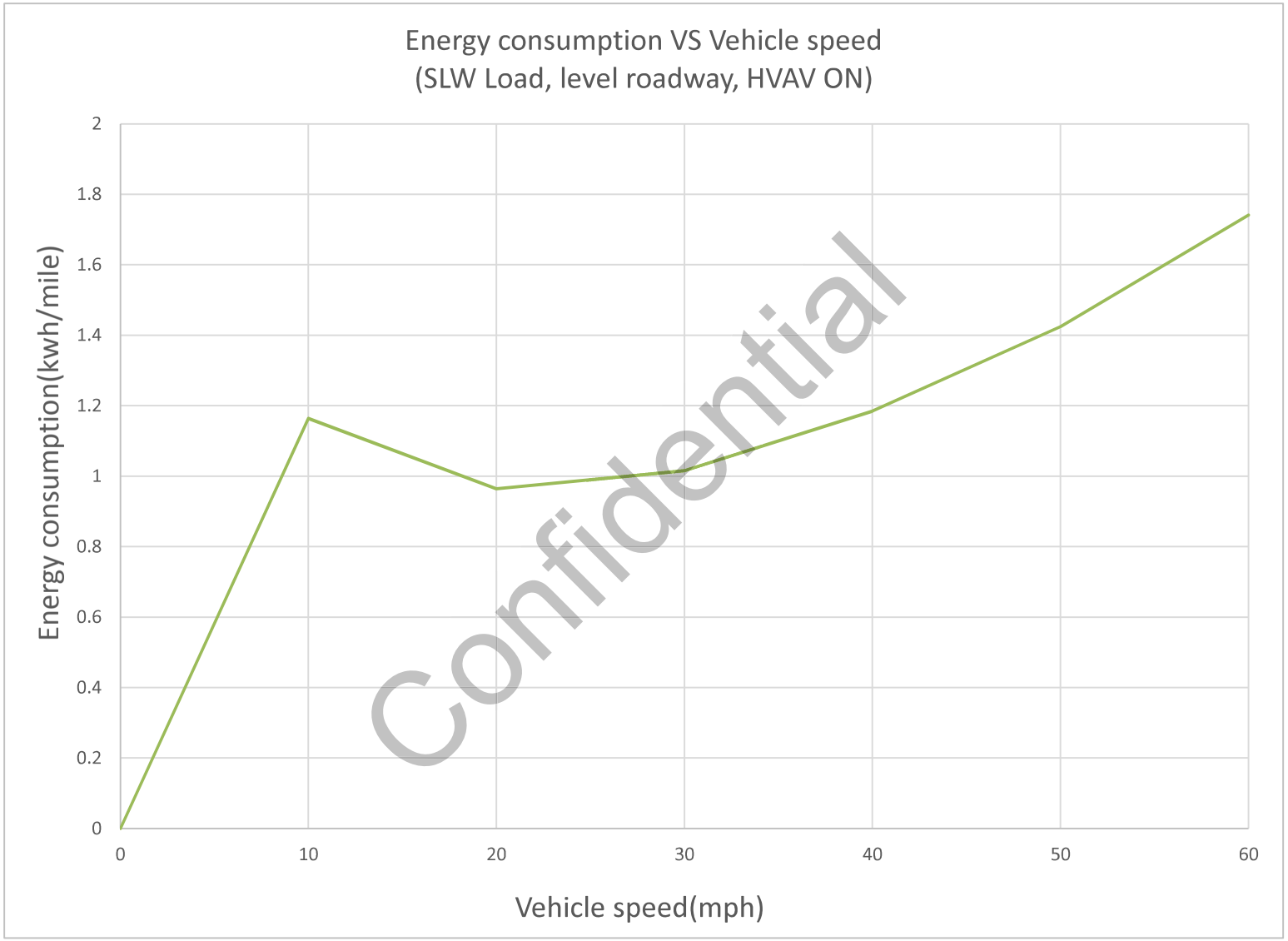

Change in acceleration VS Time
Change in acceleration(m/s^3)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15
20
25
30
35
Time(s)
Confidential

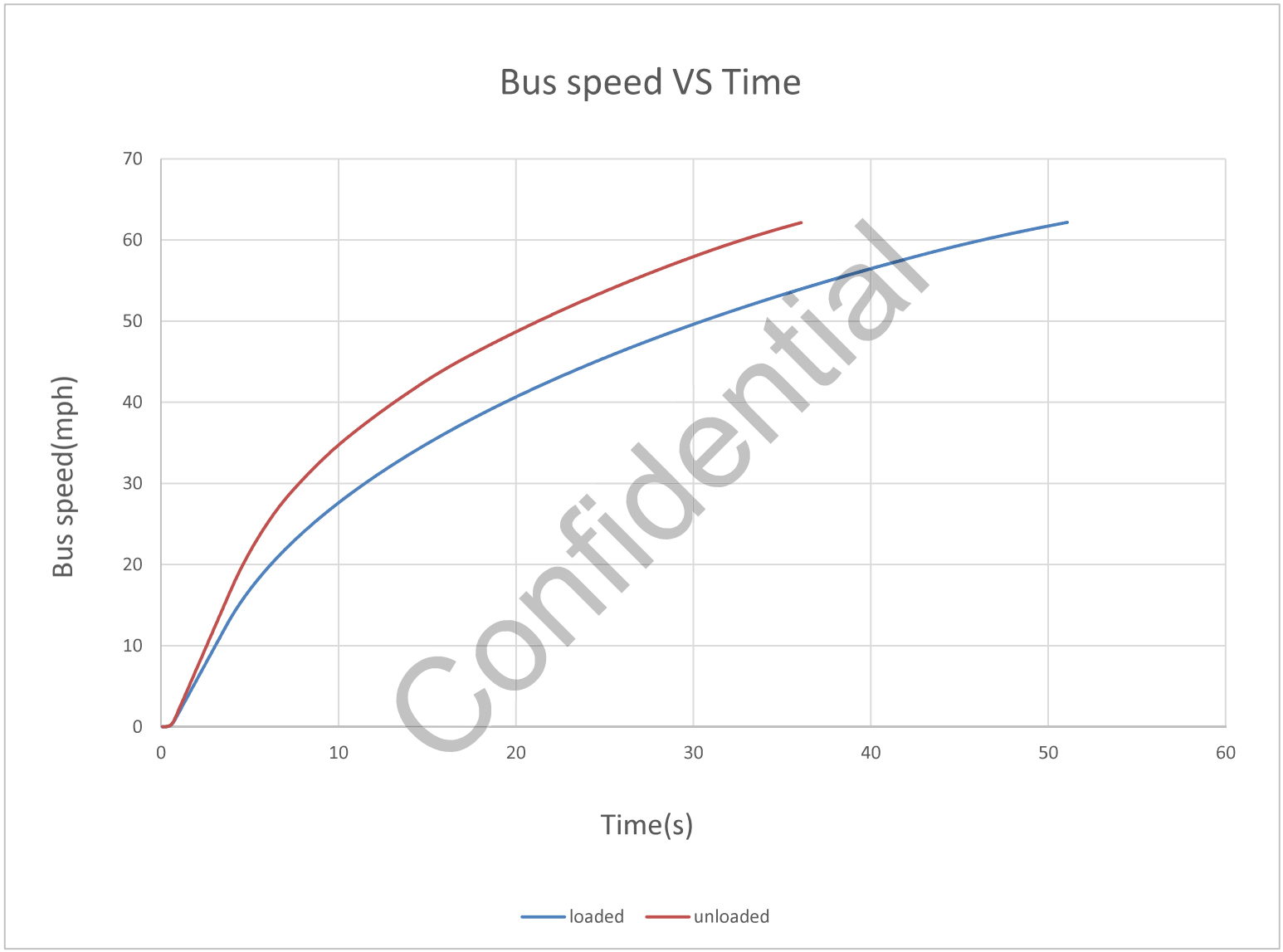
CER 10 VEHICLE TECHNICAL QUESTIONNIARE K9MER 40FT


Motor speed VS Road speed
Road speed(mph)
70
60
50
40
30
20
10
0
0
2000
4000
6000
8000
10000
12000
Motor speed(rpm)
Confidential


Torque VS Motor speed
600
500
400
300
200
100
0
Torque(N.m)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Horsepower VS Motor speed
250
200
150
100
50
0
Horsepower(PS)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
Motor speed(rmp)
Confidential


Energy consumption VS Vehicle speed
(SLW Load, level roadway, HVAV ON)
Energy consumption(kwh/mile)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
Vehicle speed(mph)
Confidential



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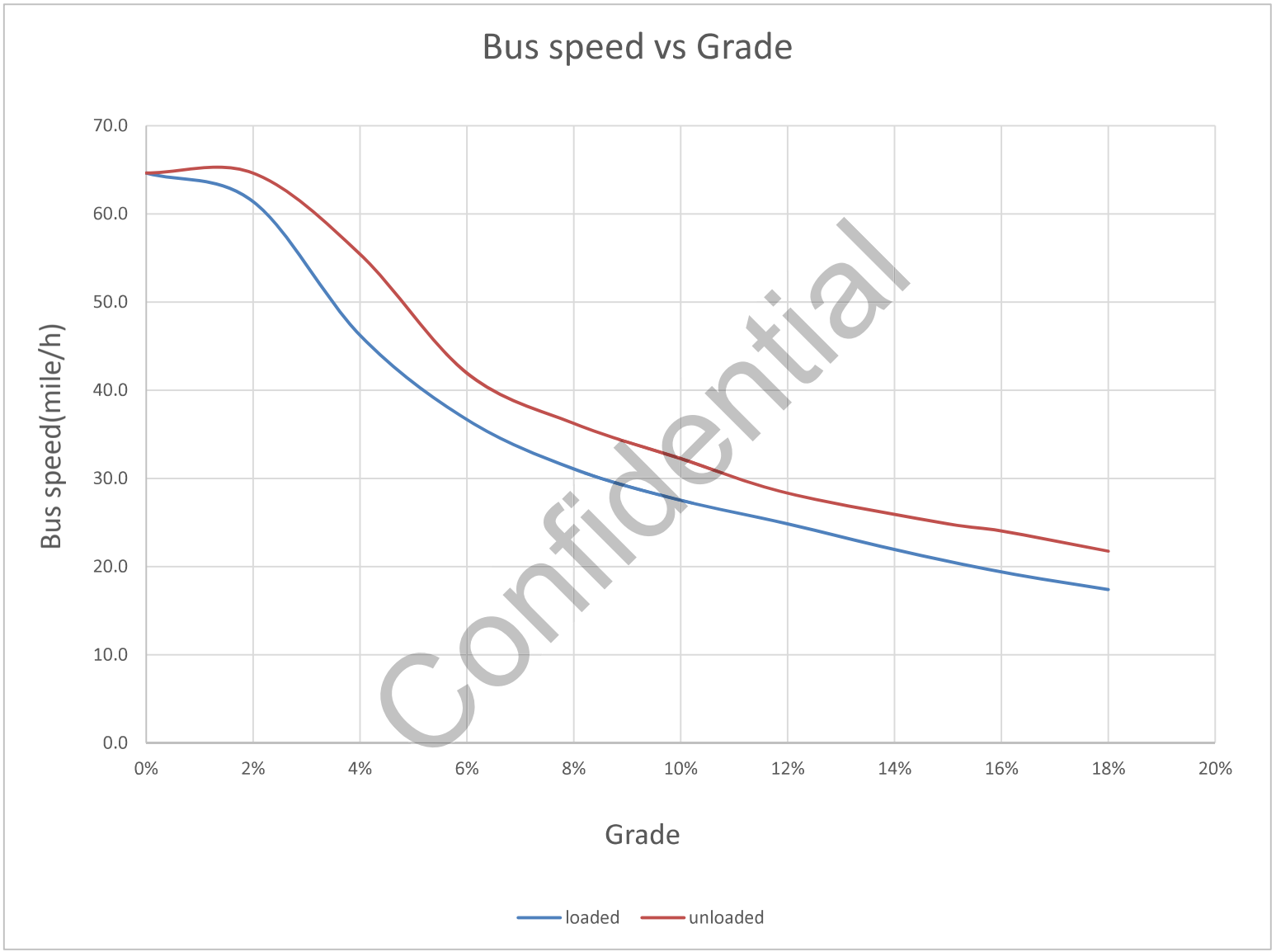

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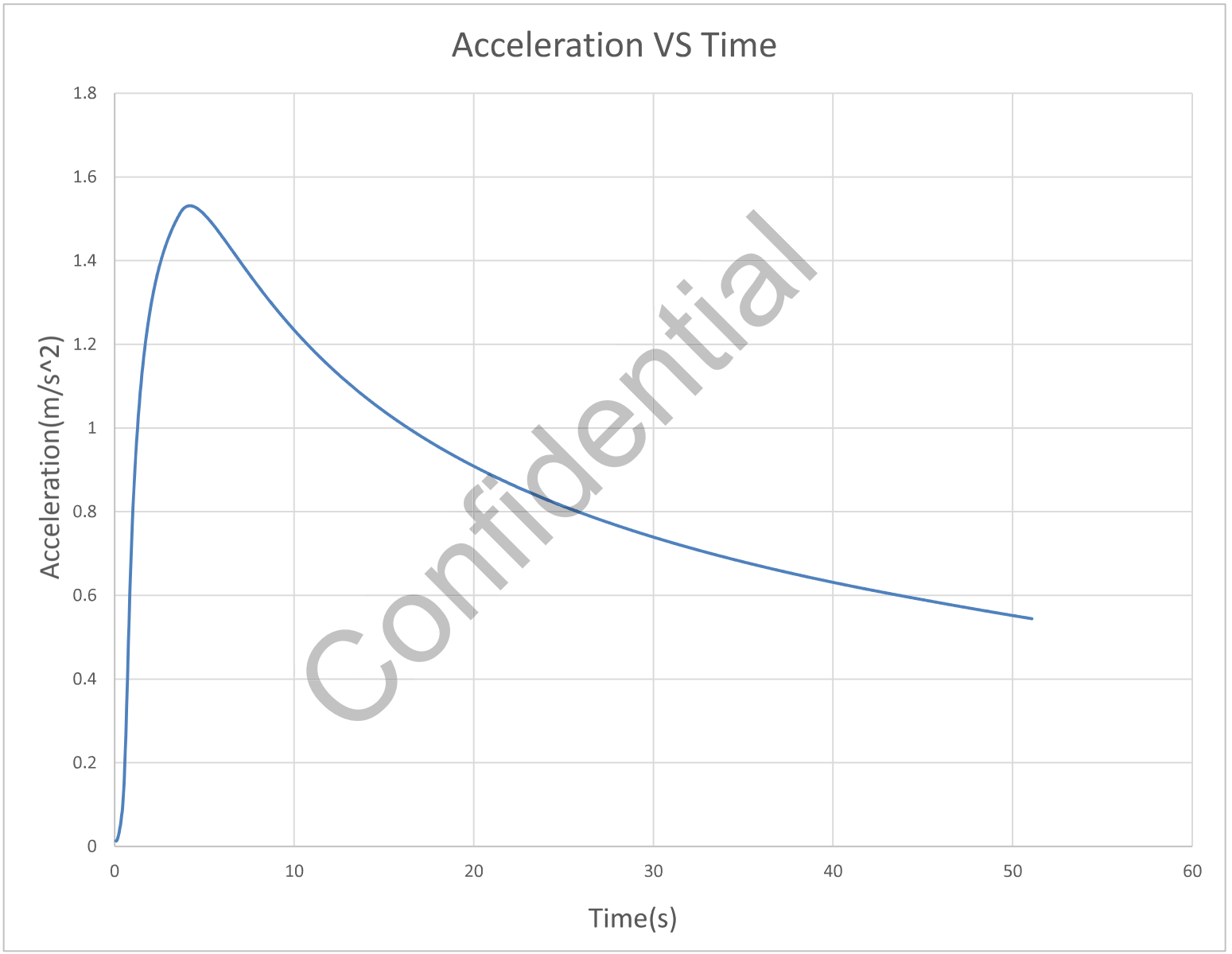
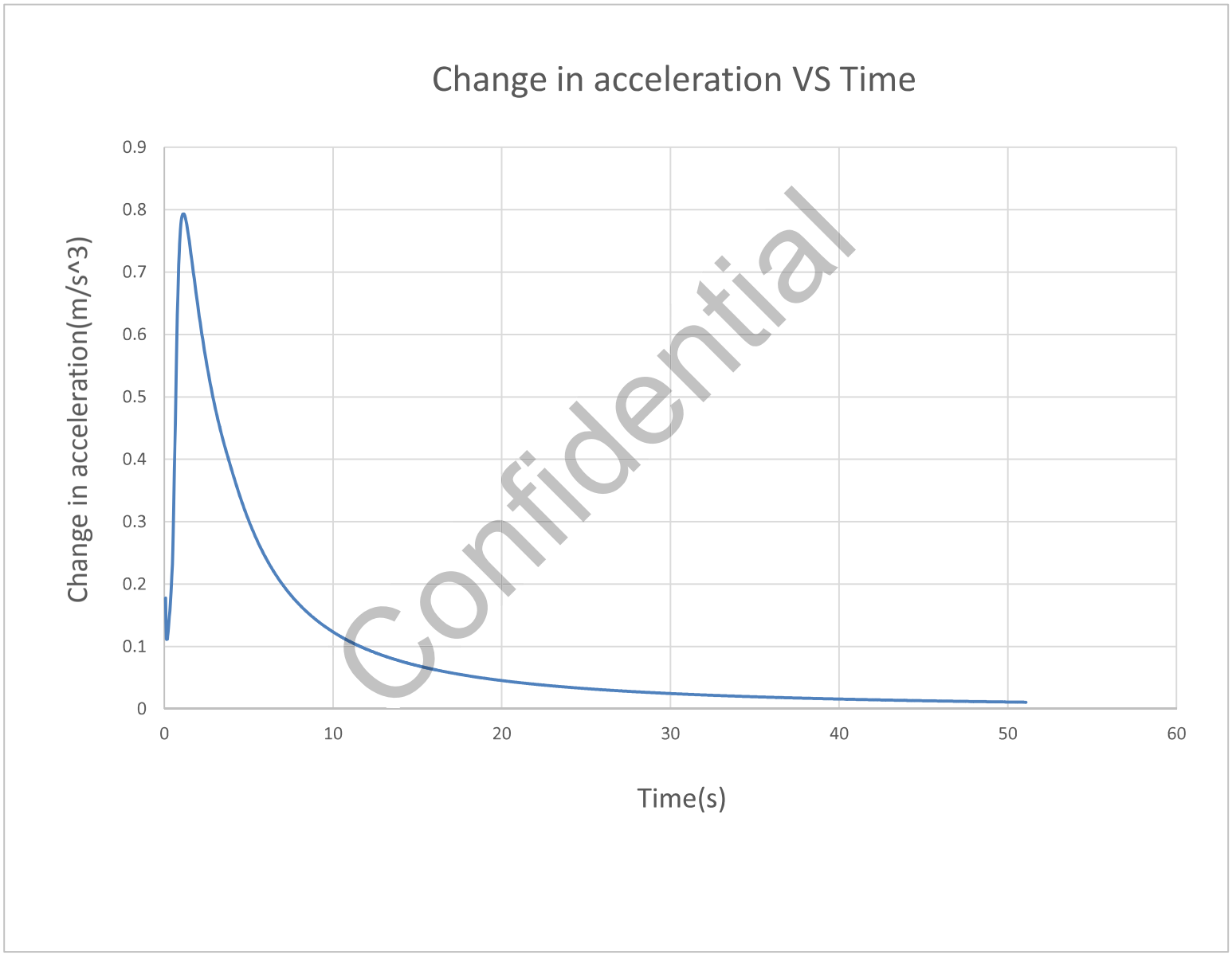
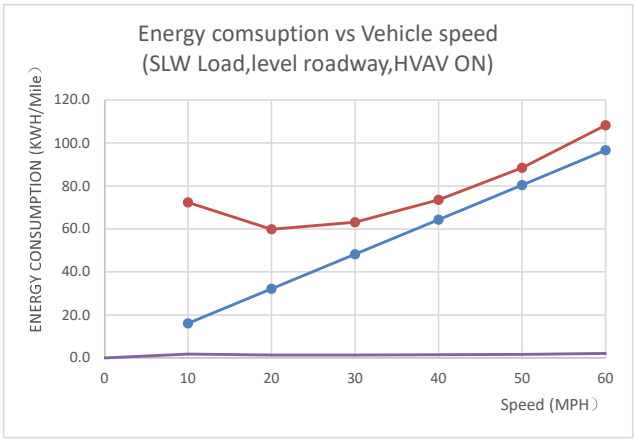
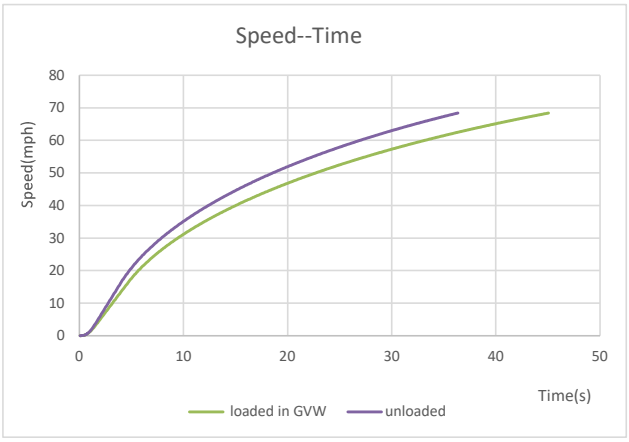

Acceleration VS Time
Acceleration(m/s^2)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
10
20
30
40
50
60
Time(s)
Confidential

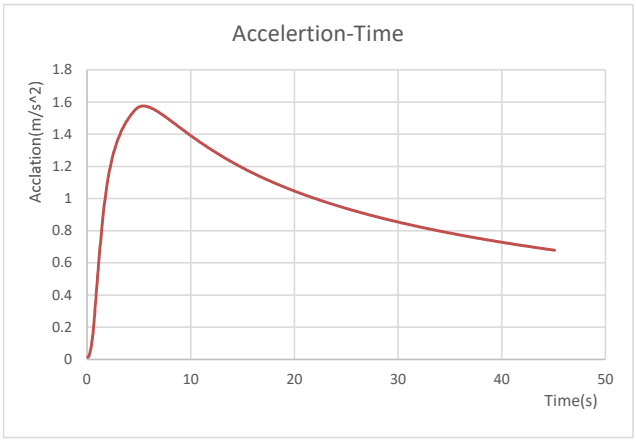


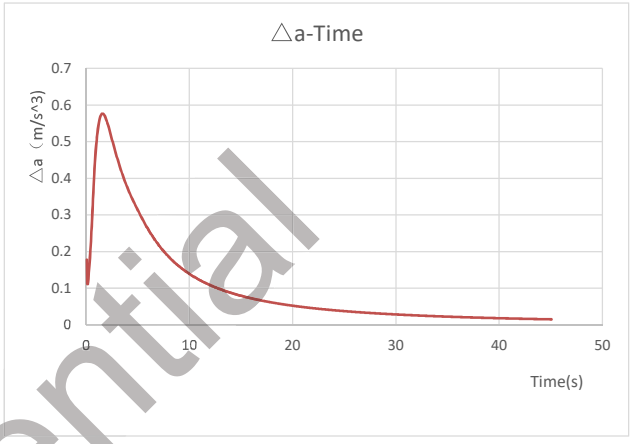
Confidential

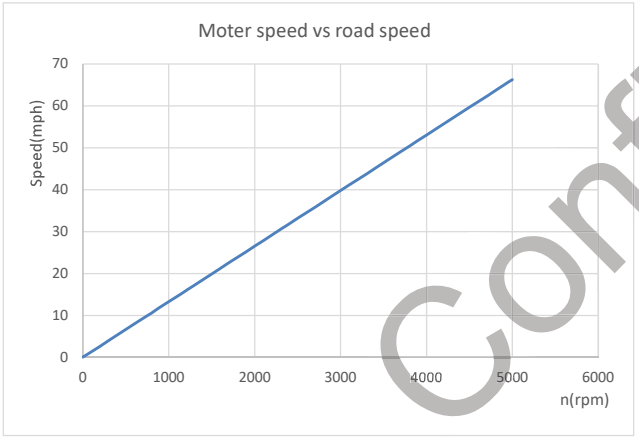
CER 10 VEHICLE TECHNICAL QUESTIONNIARE C10M 45FT

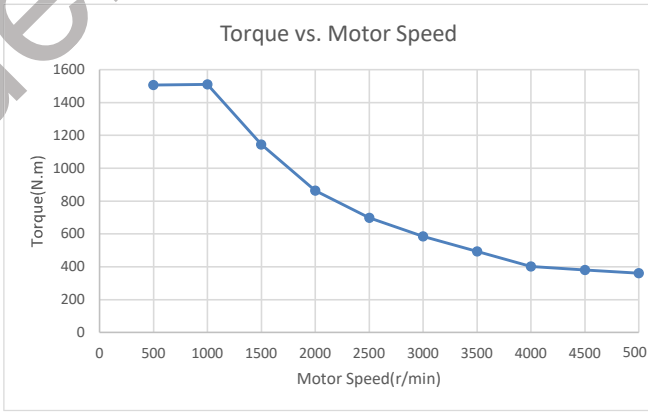


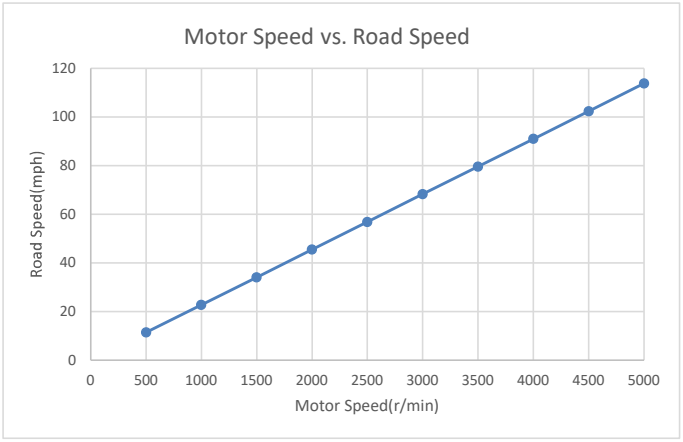


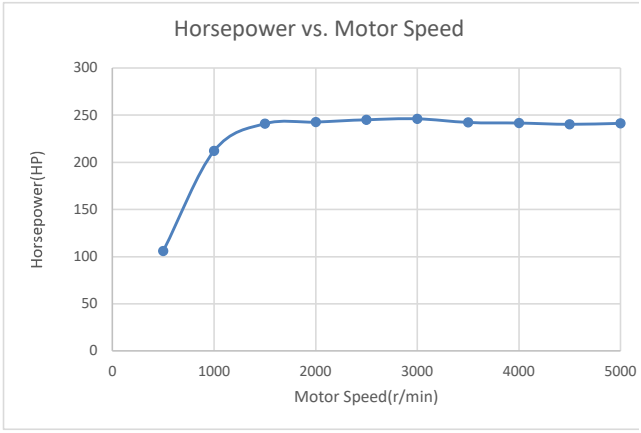












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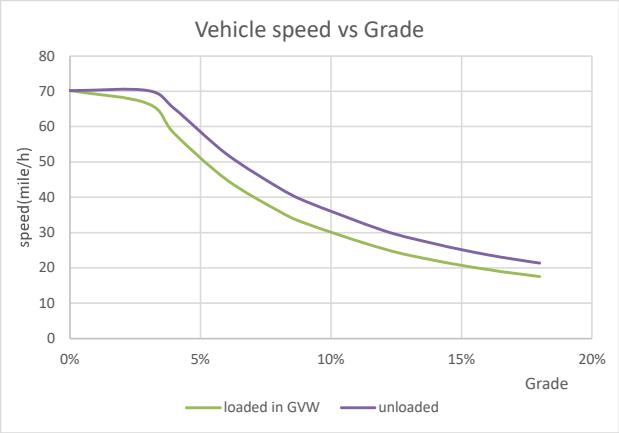
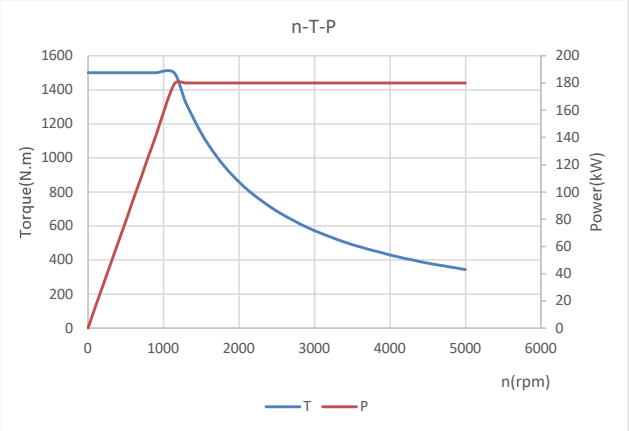
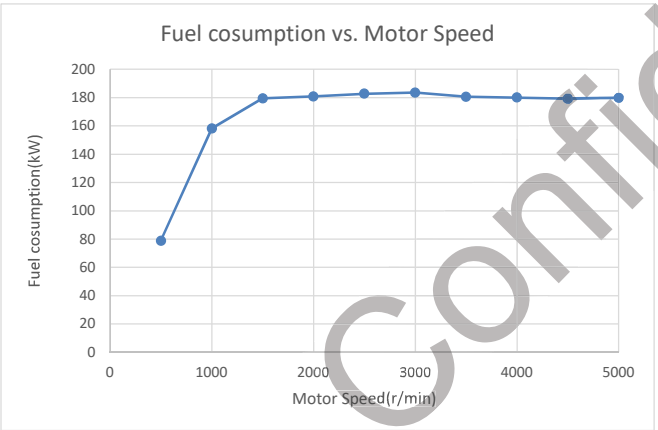
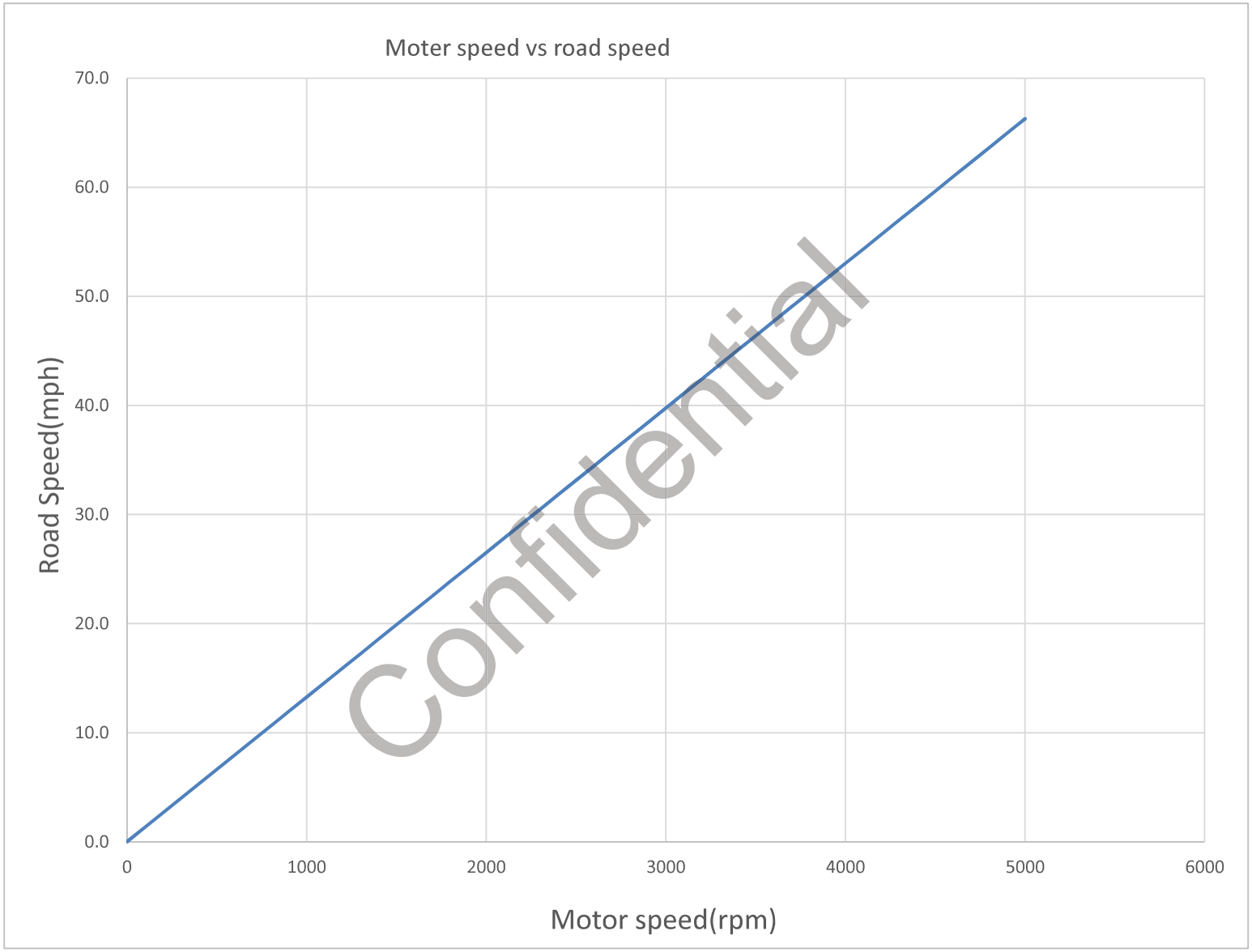






Confidential

CER 10 VEHICLE TECHNICAL QUESTIONNIARE K11M 60FT



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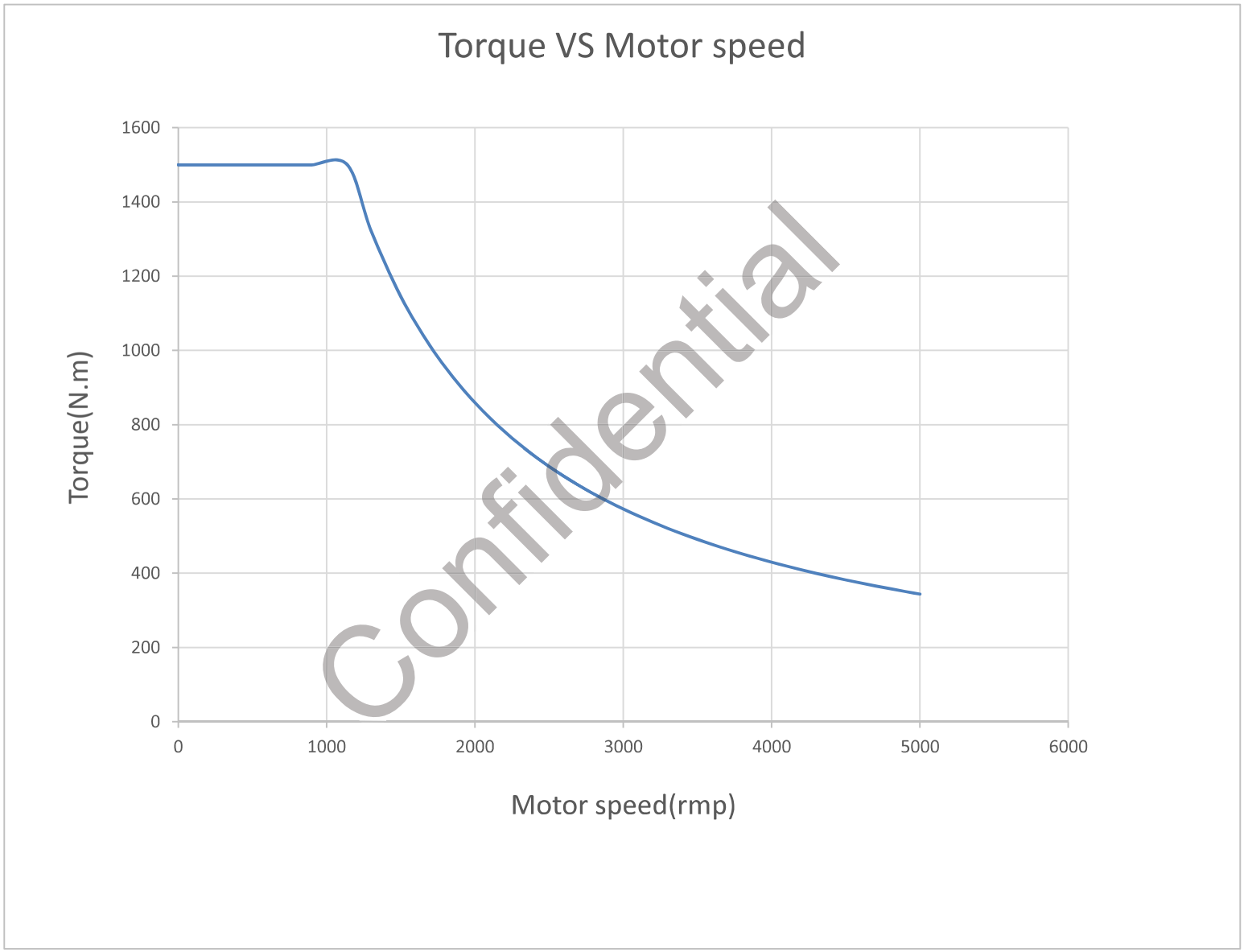

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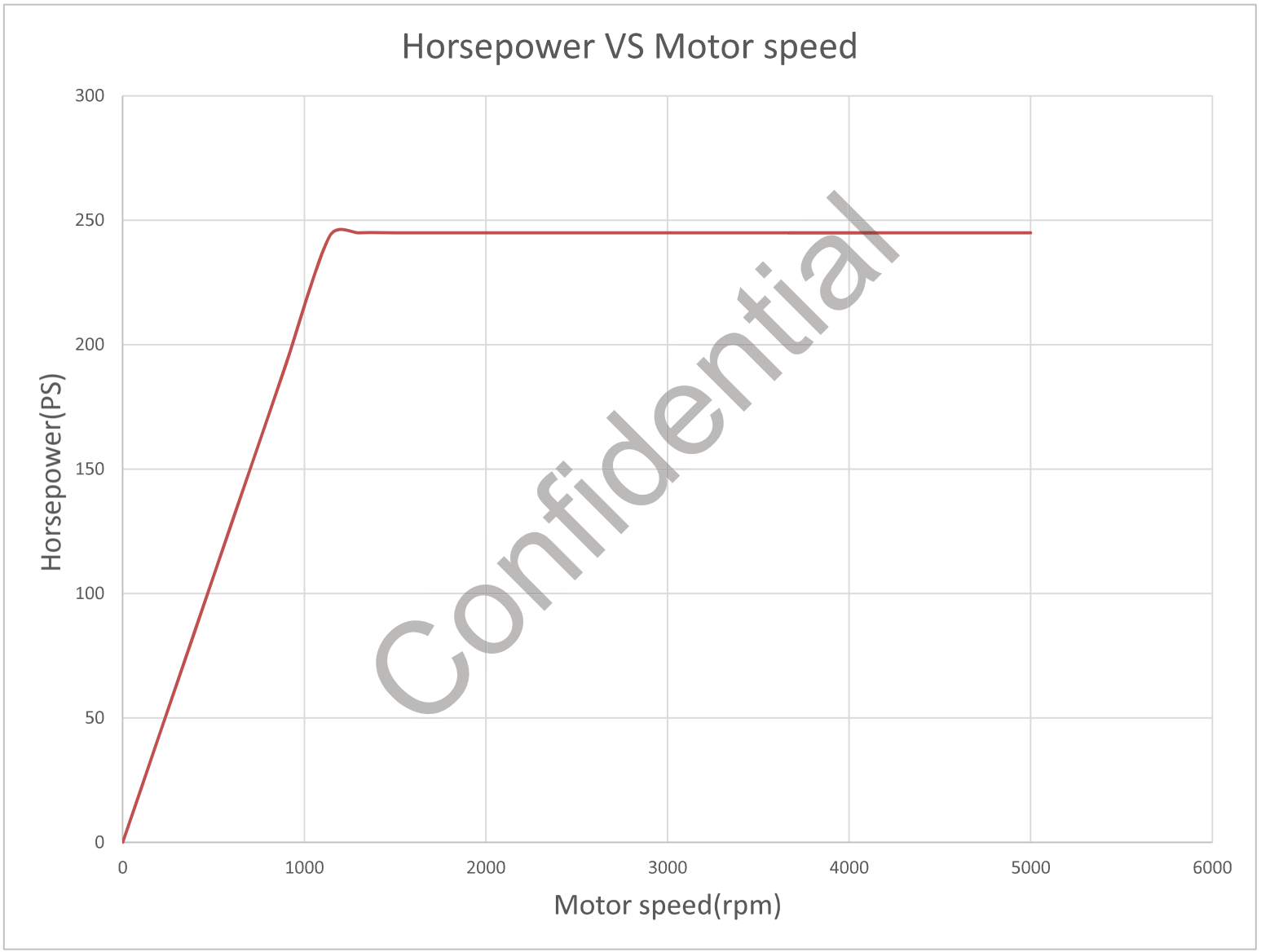
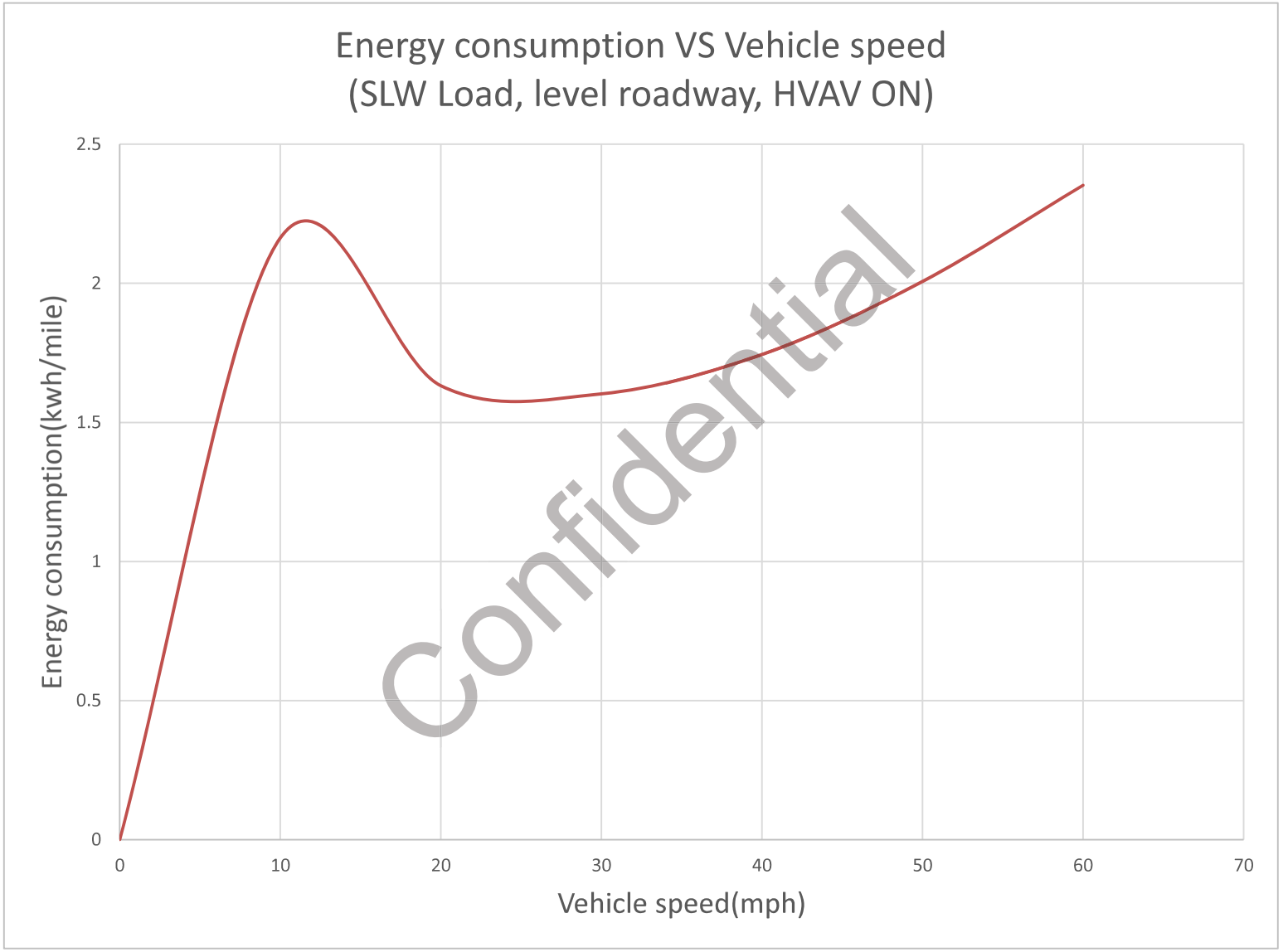
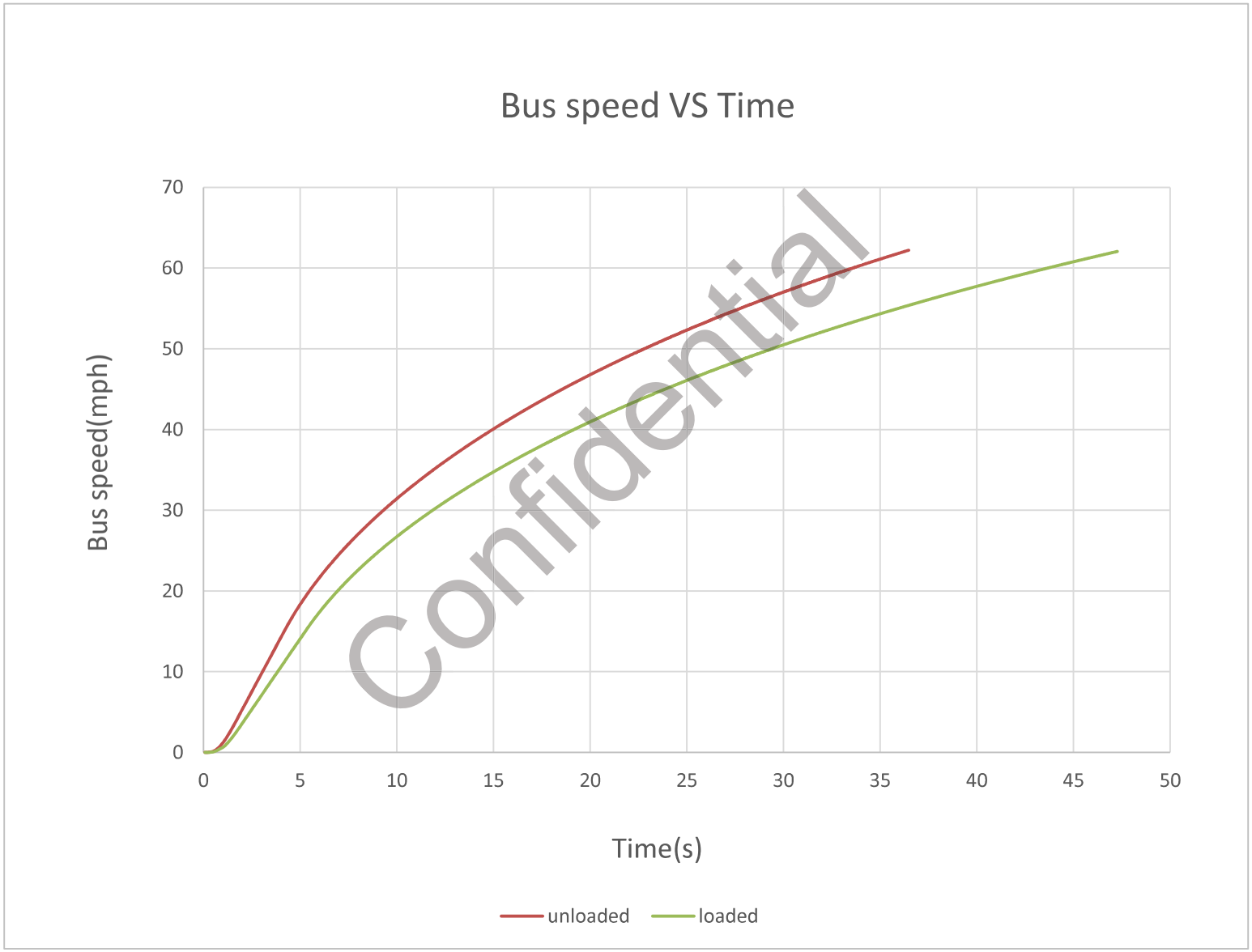
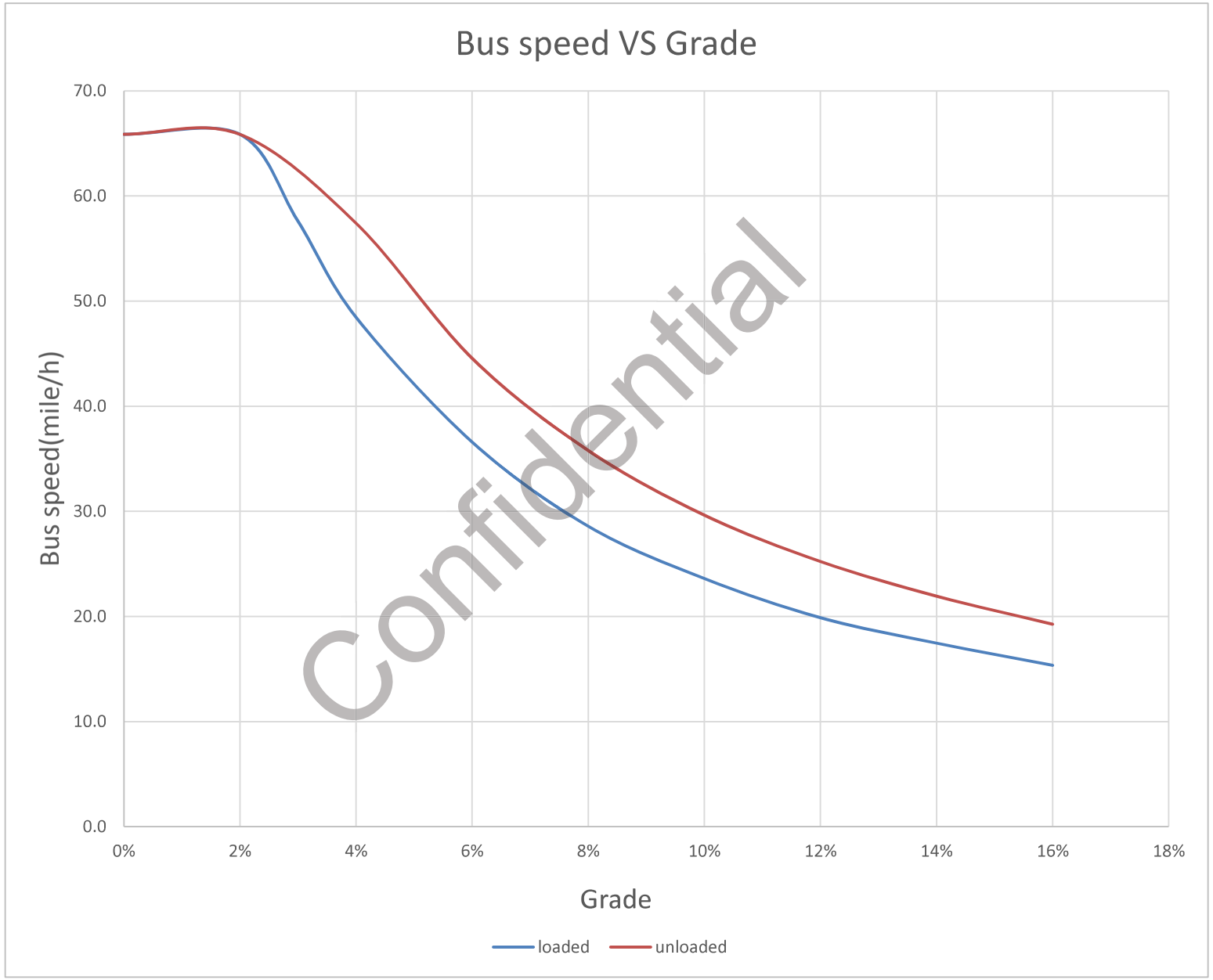
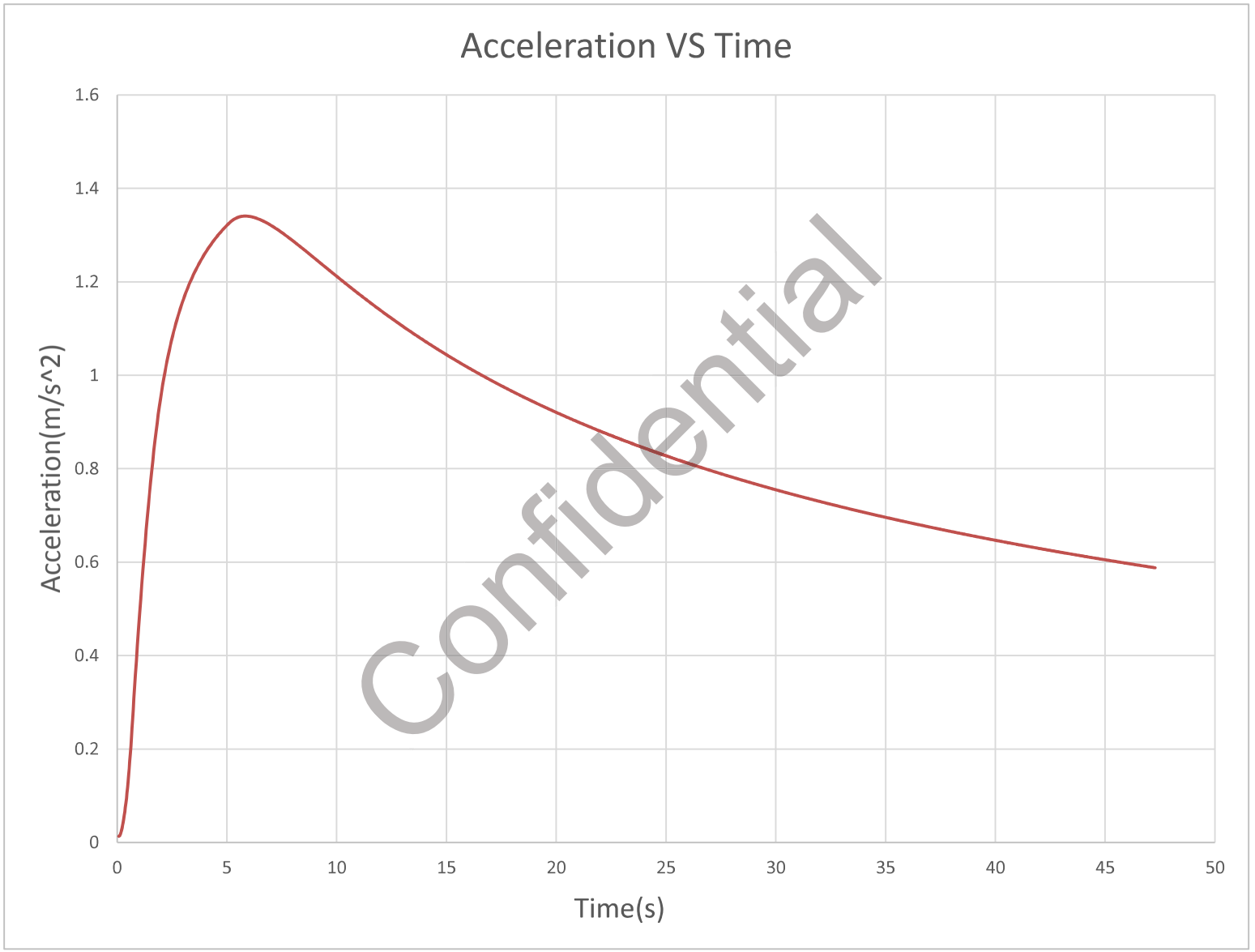
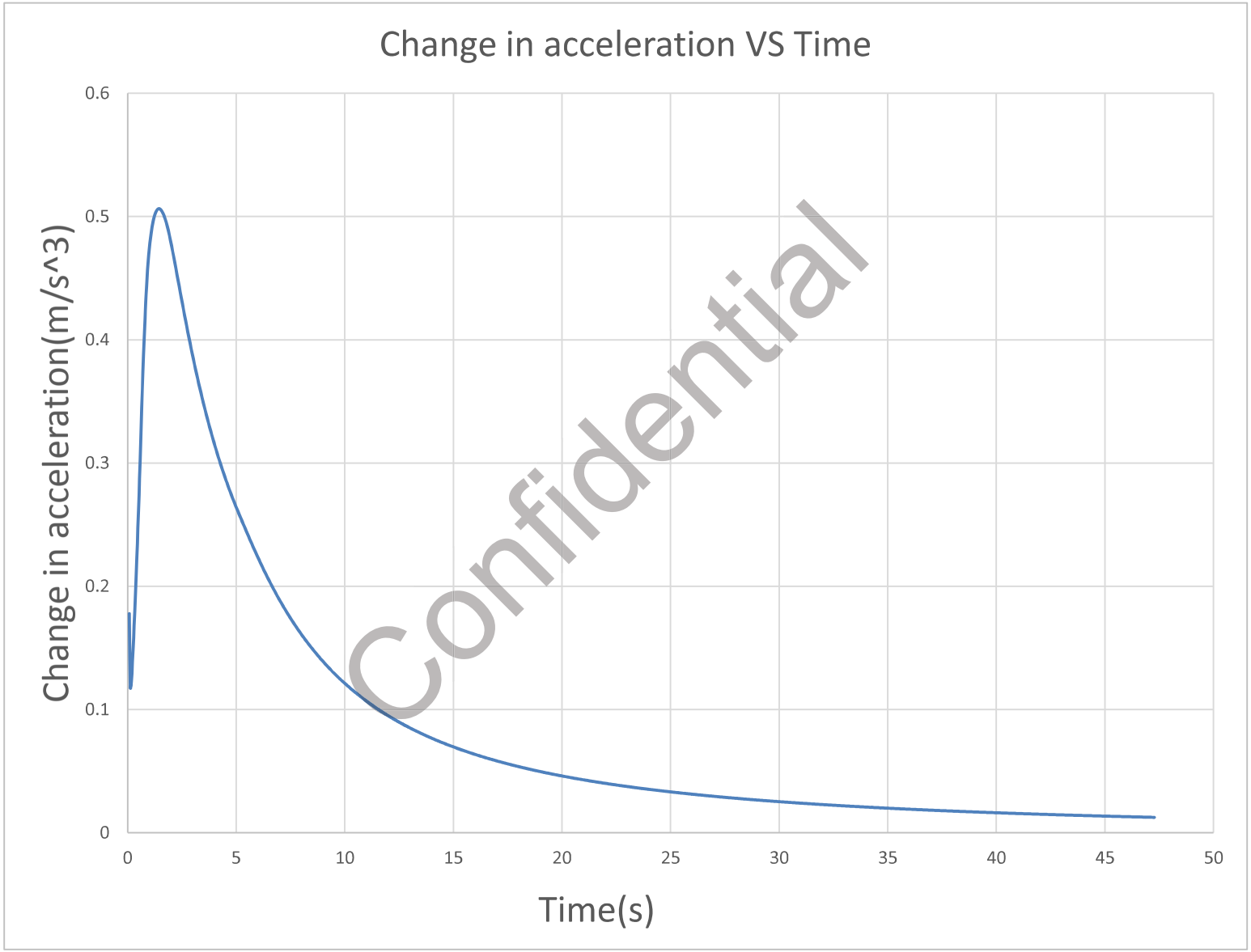

Horsepower VS Motor speed
300
250
200
150
100
50
0
Horsepower(PS)
0
1000
2000
3000
4000
5000
6000
Motor speed(rpm)
Confidential


Energy consumption VS Vehicle speed
(SLW Load, level roadway, HVAV ON)
Energy consumption(kwh/mile)
2.5
2
1.5
1
0.5
0
0
10
20
30
40
50
60
70
Vehicle speed(mph)
Confidential


Bus speed VS Time
Bus speed(mph)
70
60
50
40
30
20
10
0
0
5
10
15
20
25
30
35
40
45
50
Time(s)
unloaded
loaded
Confidential


Bus speed VS Grade
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Bus speed(mile/h)
0%
2%
4%
6%
8%
10%
12%
14%
16%
18%
Grade
loaded
unloaded
Confidential


Acceleration VS Time
Acceleration(m/s^2)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
5
10
15
20
25
30
35
40
45
50
Time(s)
Confidential


Change in acceleration VS Time
Change in acceleration(m/s^3)
0.6
0.5
0.4
0.3
0.2
0.1
0
0
5
10
15
20
25
30
35
40
45
50
Time(s)
Confidential

BYD BATTERY WHITE PAPER

BATTERY WHITE PAPER

The Safety Aspects of the BYD Iron-Phosphate Battery ("LiFePO4", "LFP", or "Fe" Battery)

MANUFACTURING
BYD Coach and Bus LLC
46147 BYD Blvd.
Lancaster, CA 93534

HEADQUARTERS
BYD Motors Inc.
1800 South Figueroa Street
Los Angeles, CA 90015

EAST COAST OFFICE
BYD Motors Inc.
1481 Blondell Avenue
Bronx, NY 10461

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BACKGROUND AND VISION

BYD's overarching corporate goal is to spur the mass-market adoption of green technologies and drive dramatic global economic and environmental recovery. BYD believes that we are in a unique position to do this as we have developed the industries only environmentally friendly battery chemistry: BYD "Iron-Phosphate" Battery (hereafter, Fe Battery). This battery technology has been facilitator for two major technological breakthroughs within the global push to eliminate the dependence on heavy pollution emitting fossil fuels. (1) It enables renewable power generation to be relevant for grid operations with firm "dispatch able" capacity. (2) It enables the introduction of long-range, long-service life, and fast charging capable electric vehicles. Utilizing BYD's Fe Battery chemistry, we are capable of linking affordable solar/renewable energy power made relevant with environmentally friendly battery storage that is delivered responsibly to transportation—this in essence has completed the true ZERO Emissions Ecosystem. Being able to deliver a true zero-emissions solution that is mass-market scalable is the cornerstone of BYD's "Three Green Dreams" strategy and BYD's "Green City Solutions" (GCS) initiatives.

Figure 1: Green City Solution

The first step of BYD's GCS is providing an efficient and effective 100% battery electric public transportation solution, which when integrated offers immediate environmental benefits. BYD's battery electric buses utilizes the same environmentally friendly Fe Battery that is supplied within our large scale fixed Energy Storage Stations (ESS). BYD develped its Fe Battery Chemistry to not contain any heavy metals or toxic electrolytes as well as have the least amount of enviornmental impact of any electric vehicle battery system in the market today. In comparison to traditional diesel engine or CNG powered transit buses, BYD's all electric buses

provide both qualitative and quantitative benefits that will have short- and long-term impacts on both a micro-level fleet operation and the marco-level enviornmental impacts.

On the micro-level, BYD's Battery Elecric buses will cut transit operating cost by over 30% in comparison to utilizing an equivalent diesel or CNG vehicle. This added influx of overhead capital to a transit agency will produce an immediate impact on the community in terms of job growth, which will in turn lead to a downstream economic growth in the same community. Futhermore, utilizing BYD's Battery Electric buses, which per Altoona Test results are on average 5% quieter than other electric bus manufactures, extremely reduces the overall noise pollution generated by not only diesel and CNG buses but with other electric bus manufactures. On the marco-level, replacing the existing diesel and/or CNG buses with BYD battery electric buses will lead to over 80% reduction in CO2 emissions per day. The CO2 emissions from one diesel and/or CNG bus per day is equilvent to the lose of over 400 acres, however, replacing those existing engine times with BYD Battery Electric Buses will lead to an over 75% reduction in the amount of forest lost per year from one vehicle.

BYD will transform the world's public transportation through use of our environmentally friendly long-range zero emissions battery electric transit bus through reduction of the overall carbon footprint by providing a solution to eliminating the overarching dependance on oil. BYD's believes that our electric bus will ultimately increase ridership while reducing the total life-cost by more than half a million dollars per bus through the 12-year normal transit operating life cycle. BYD's battery technology allows the bus to travel up to an unprecedented 250+ miles on a single overnight charge. Through our continued standardization of our electric buses, it has lead to large-scale manufacturing in the US and significant component cost reductions that translate into growth the US Jobs market for Green Technology. Today, there are not any large-scale US battery manufactures of safe, stable, and environmentally friendly rechargeable batteries, nor are there any long-range all-electric US Bus Manufactures that are capable of meeting the demands of a zero-emissions battery electric transit bus without a signficant premium capital cost to a transit agency. BYD's battery technology has been proven both in the US as well as worldwide. As of 2017, we have over 800 million battery electric transit bus fleet miles that have provide daily revenue service.

Furthermore, when BYD produces our Fe Battery, we consider the Total Life Cycle of each cell. Unlike other electric bus manufactures that provide a single use of their batteries, BYD is in a unique position, because of our vertical integration, to repurpose batteries from our transit buses (once they reach their useful life cycle) into our own Energy Storage Systems. We are our own customer for repurposing as well as recertifying packs and modules.

Figure 2: Total Life Cycle of Cell

CHAPTER 1: BATTERY DESIGN

BYD internally developed the Fe Battery chemistry to ensure the stability and safety of each of our electric vehicles. BYD calls our batteries "Iron-Phosphate" versus "Lithium-Iron-Phosphate" because the dominate materials within the chemistry are Iron and Phosphate with only trace amounts of lithium doped on the cathode/anode and in the salts of electrolyte. For the purpose of this paper, battery "safety" will be categorized into Cell, Module, and Pack "electricity safety" and "thermal stability". To begin, we have provided a general comparison of the most prevalent EV battery chemistries (including the BYD Fe Battery which is listed as "LiFePO4").

	LCO $LiCoO_2$	NCA $LiNiCoAlO_2$	NMC $LiNiMnCoO_2$	LMO $LiMn_2O_4$	LFP $LiFePO_4$	LTO* $Li_4Ti_5O_{12}$	Si-C*
Cell Voltage, 100%/50% SOC	4.2V/ 3.8V	4.0V/ 3.6V	4.2V/ 3.7V	4.2V/ 3.9V	3.6V/ 3.3V	2.8V/ 2.4V	4.2V/ 3.9V
Energy	++	+++	+++	+	++	-	+++
Power	++	+++	++	+++	++	+	++
Calendar Life	+	+++	+	-	++	-	-
Cycle Life	+	++	++	++	++	+++	--
Safety	+	+	+	++	+++	+++	+
Cost	-	+	++	++	+	-	++

Figure 3: Overview of Available Battery Chemistries[1]

[1] Choices in Lithium Ion Battery Chemistries (Wiaux and Chanson 2013)

BYD Chemical Make-Up Discussion

The make-up of all commercially available lithium ion batteries consists of an inorganic lithium-intercalating compound as a positive electrode, a lithium-intercalating carbon negative electrode, and a lithium salt in an organic liquid, known as the electrolyte. Both electrodes must be separated by an insulator like a thermoplastic polymer. Most manufacturers use a polypropylene. Polypropylene has a melting point of 160°C (320°F) and is very resistant to most chemical solvents, bases, and acids. When a cell charges and discharges, lithium ions shuttle between the cathode (positive electrode) and anode (negative electrode). Upon discharge, the anode undergoes oxidation, or loss of electrons, and the cathode sees a reduction, or a gain of electrons. Charging reverses this sequence a depiction is provided in the figure below.

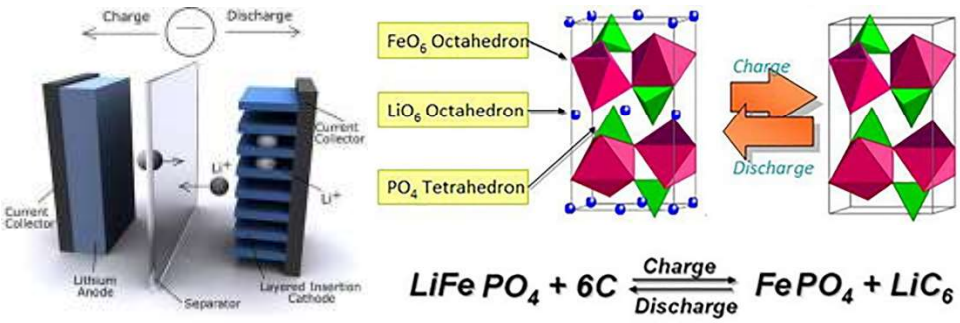

Figure 4: BYD Fe Battery Chemistry Make-Up

Lithium-ion cells have historically used lithium-metal-oxides as cathode materials due to their high capacity for lithium intercalation, and have suitable chemical and physical properties required for Lithium-ion electrodes. Layered materials, such as LiCoO2 and LiNiO2, or a combination of these metals, have been the most extensively used and investigated cathodes (most consumer electronic single-cell applications use these because of their very high energy density). These type of cathodes show instability (LiCoO2, LiNiO2).

When BYD refers to “thermal instability”, we mean that these battery chemistries (LiCoO2, LiNiO2) can at times have an internal thermal event that can escalate quickly causing rapid-disassembly and explosion producing dangerous shrapnel as well as projecting those flames. This is at times understated by the industry as “venting”. In order to avoid thermal instability, other lithium-metal oxide materials with a “spinel” structure (e.g. LiMn2O4) have been manufactured to substitute the layered materials. This oxide is inexpensive and environmentally friendly, but has significant disadvantages related to capacity depreciation, especially at high temperatures (these chemistries are not suitable for long-cycle requirements in vehicle applications especially if rapid-charging is required. Many EV manufactures will not honor batteries warranties if the vehicle is utilizing daily rapid charging). BYD has developed olivine structures materials (e.g. LiFePO4) and these have emerged as a reasonable cathode replacement for the safety levels required in vehicle application. Iron-Phosphate has the following properties which set it apart:

- Relatively inexpensive material cost

- High average cycling voltage due to flat potential of 3.4 V vs Li/Li+
- Reasonably high theoretical capacity
- Designed less “toxic” compared with other Li-Ion, LiCoO2 systems
- Suppressed thermal runaway

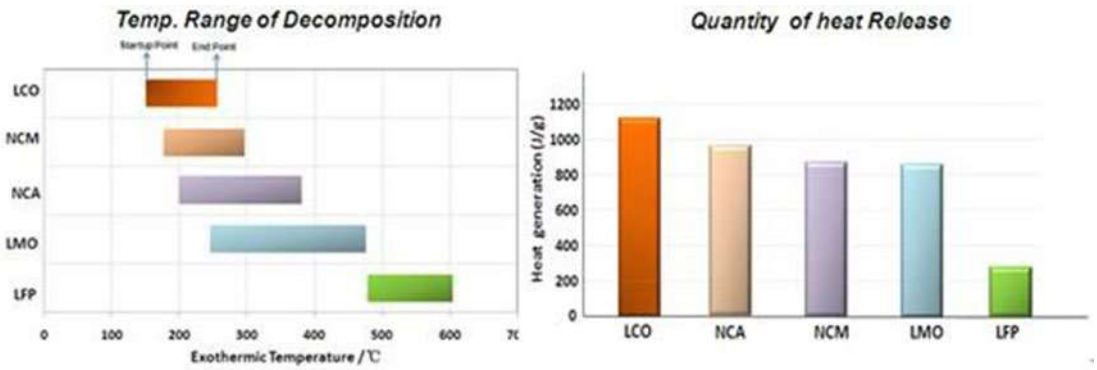

Figure 5: Battery Thermal Properties

The figures above show Iron-Phosphate (called LFP) has the highest required decomposition temperatures and the lowest thermal release. LFP has the best safety performance in comparison to various kinds of lithium technologies. This property is attributed to the high covalent feature of the P-O bonds in the tetrahedral (PO4) units (shown below), which stabilizes the olivine structure between charging and discharging and completely prevents oxygen release from the charged olivine materials up to 600C.

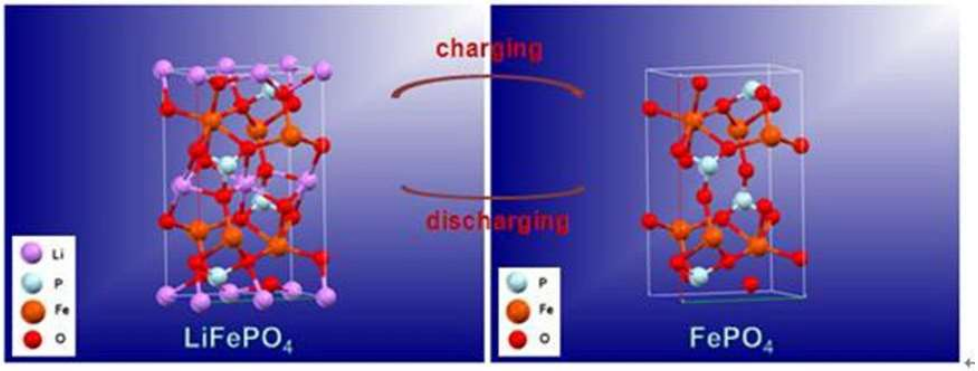

Figure 6: Fe Battery Chemistry Decomposition

LiFePO4 and FePO4 have excellent thermal stability. FePO4 releases in temps around 410C and at a rate of 210J/g. In contrast, LiCoO2 begins to decompose oxygen at only 240C and at a rate of over 1000J/g. This drastic release of O2 is the main reason why lithium batteries explode (“vent”) during thermal events. There is an overall industry agreement on the remarkable thermal stability of the LiFePO4 and its delithiated counterpart, and the recognition that LiFePO4 is a safer cathode material than the commonly used lithium metal oxide cathodes.

BYD Cell Design

Proper design of the cell, battery and the battery compartment is important to assure optimum, reliable, and safe operation. Many problems that are normally attributed to the battery could be prevented with proper precautions taken with both during the design of the cell and battery-pack themselves. Here are the areas that need to be reviewed:

- **Cell chemistry** - The quest for long-powered run-times results in higher energy and power densities, so even more reactive chemical mixes have been utilized. But these highly reactive properties which are needed to provide the higher energy densities are likely to increase the risk of danger in case of cell failures. For safety reasons, BYD balances maximum power and safety by optimizing the component proportion (active materials, binder, conductive, etc.)
- **Electrode design** – BYD confirms the electrode structures according to many experiential models, such as current distribution models, thermal models, electrochemical models, and mechanics models, to reduce the resistance, optimize the current distribution and thermal distribution in the cell. Good current and thermal distribution can ensure the long-term stability and safety of the cell.
- **Pack Capacity design** – Generally, for a cell, the higher capacity, the lower the safety. However, BYD optimizes the balancing point of the cell capacity and the safety according to internal math models and safety testing. Using a higher capacity cell design, the total number of cells in a pack can decrease, and thus reliability of the battery system can increase (eg. Instead of using 8134 individual cells as in the Tesla Roadster, BYD is able to achieve the same capacity and range with about 100 larger-format cells with fewer connection points and potential points of failure).
- **Mechanics design** – BYD cell adopts high strength aluminum cases, and EPI, CHS patented seal- technology, which increases the seal integrity and anti-eroding levels, and also satisfies a more-than-15 years seal and life requirement.
- **Cell construction** - For higher power cells, the thermal design can be a source of weakness. Getting the excess heat out of the cells can be a problem and poor designs can result in localized hotspots within the cell which may cause cell failure. Good thermal performance for high power cells requires substantial thermal conduction paths. BYD uses thermal imaging to confirm our best-in-class thermal balancing inside a cell:

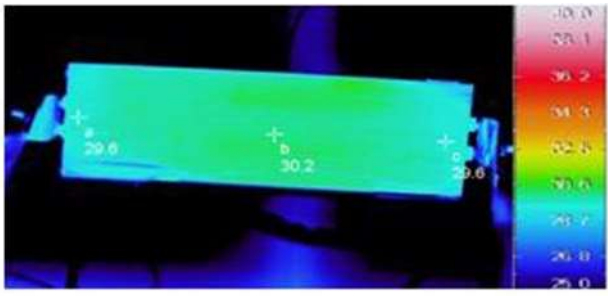

Figure 7:Fe Battery Thermal Distribution

- **Vent** - If other safety devices fail and a cell is exposed to high heat, chemical reactions can result in out-gassing and the active materials will expand due to the increasing

temperatures. This can cause a build-up of pressures inside the sealed cell which could result in rupture of the case that would possibly make a disconcerting pop or loud bang. Safety vents are needed as a final safety precaution to release this potential pressure before it reaches a rupture level. Automatic release guard vents prevent the absorption of external air into the cell, but allow controlled release of excess internal pressure to avoid leakage and prevent uncontrolled rupture of the cell case.

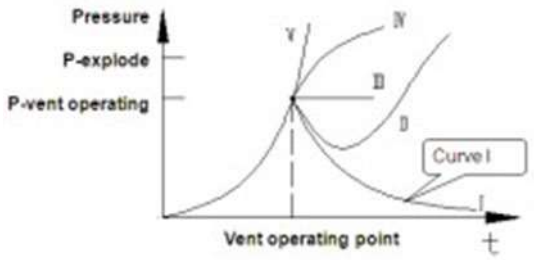

Figure 8: Vent Design Curve

BYD Cell Manufacturing

BYD's manufacturing for the battery cells is percision controlled process that magnifies the already steller design and safetry feeatures of the Fe Battery. To ensure proper manufactring of the individual cells, BYD procedural proecess incompasses the following:

- Burrs on the electrodes;
- misaligned or out of tolerance components;
- contaminated electrode coatings or electrolytes can all cause short circuits or penetration of the separator.

BYD produces each of its batteriers in a fully automatic assembly line that provides strict environment controls and high precision accuracy. Shown in the figures below is BYD's full automatic lines.

Figure 9: Cell Manufacturing

BYD Pack Connection Design

BYD's battery packs when constructed use the most reliable welding methods available for assembling battery cells within a module. BYD uses both laser and ultrasonic welding to ensure that each battery assemble is not only reliable but provide the most efficient thermal distribution.

Figure 10: Laser Welding Between Batteries and Ultrasonic welding in the cell

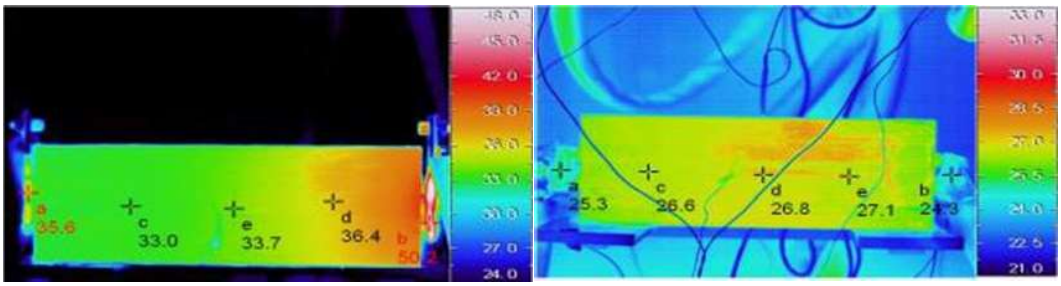

Figure 11: Thermal Distribution

BYD High Voltage Battery Layout Design

BYD has designed the layout of the High Voltage Batteries (HVB) to minimize the risk for both bus riders and maintenance personnel in a manner that specifically segments the high voltage and low voltage battery so that there are not any dangerous areas within easily accessiable areas. As shown in figure, the HVB is segmented into serveral parts. There are breaker units that separate each battery, these breaker points segment it into smaller parts with lower voltages (48V, 60V or 100V), which are then safer to touch. This will further allow for a safe shut down of BYD's electric bus.

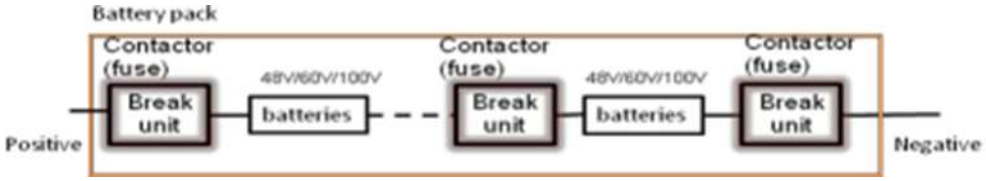

Figure 12: Battery Segmentation

From a safety and protection standpoint each of the containers that form the components within the battery packs have a safety system designed within. The example provided below is for our 40-Foot Battery Electric Bus (K9M). For PACK 1, there is one voltage divider/contactor in each

one of the two rear overhang battery packs, and one in the left front wheel area (figure 13). For PACK 2, there are two voltage divider contactors in the rooftop pack, and one in the right front wheel area (figure 13). The voltage divider contactors are located inside of the battery compartment so that it can open and close the high voltage circuit, and also can keep any live parts inside of the battery compartment when shutting down the electricity. Since the positive electrode and the negative electrode of every single battery pack are disconnected when the contactor is open, putting the contactors between each of the physical locations that comprise the two packs achieves the same safety outcome as putting the contactor between the positive and negative node of the battery, which is to isolate the positive and negative harness. The failure probability of a Voltage Divider Contactor is one in one Hundred thousand (1/100,000).

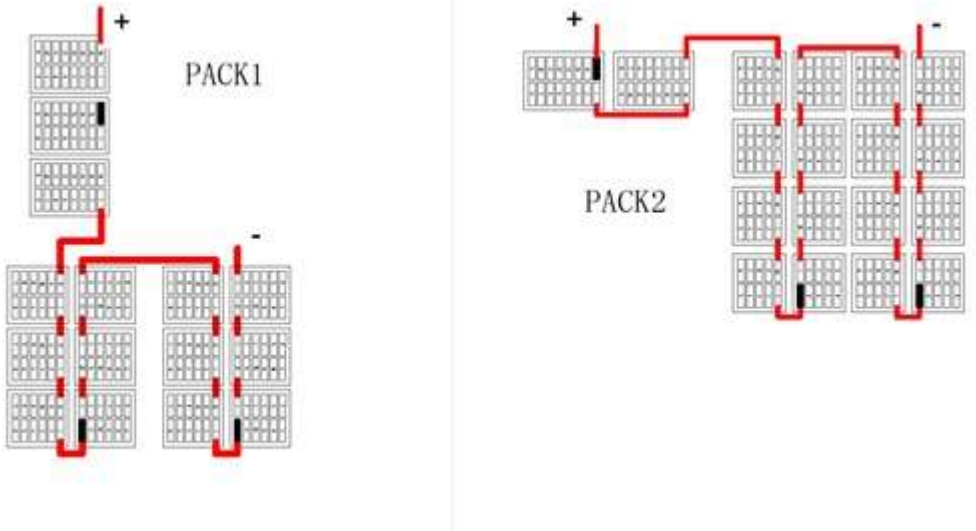

Figure 13: Pack Dividers

BYD Battery Management System

BYD's battery management system is an imbedded diagnostic and managing unit to high voltage batteries. The system utilizes controllers and data collectors. Each bus is fitted with one primary controller and one auxiliary controller for each battery pack and the appropriate number of data collectors.

The battery module data collector detects the voltage and temperature of each cell in each module. It sends the data to the auxiliary controller. The auxiliary controller sends the battery pack data to the primary controller. The primary controller controls the power battery charge/discharge, battery balancing and communicates with other modules installed on the bus. The two types of controllers are physically the same with the exception of their programming. The primary controller is programed to communicate with the CAN (control area network).

The High Voltage Battery Management System manages the charging and discharging of the HV battery, power limit, current detection, battery temperature, voltage sampling etc.... It protects the HV batteries by controlling battery contactors if electrical leakage occurs, in the

event of a collision, voltage is too high or too low, or when the temperature is outside operating parameters.

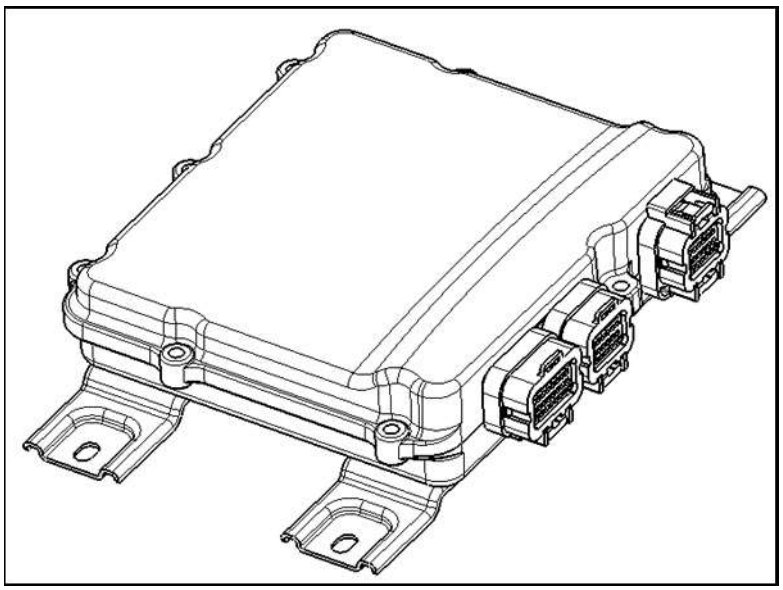

Figure 14: Primary BMS Controller

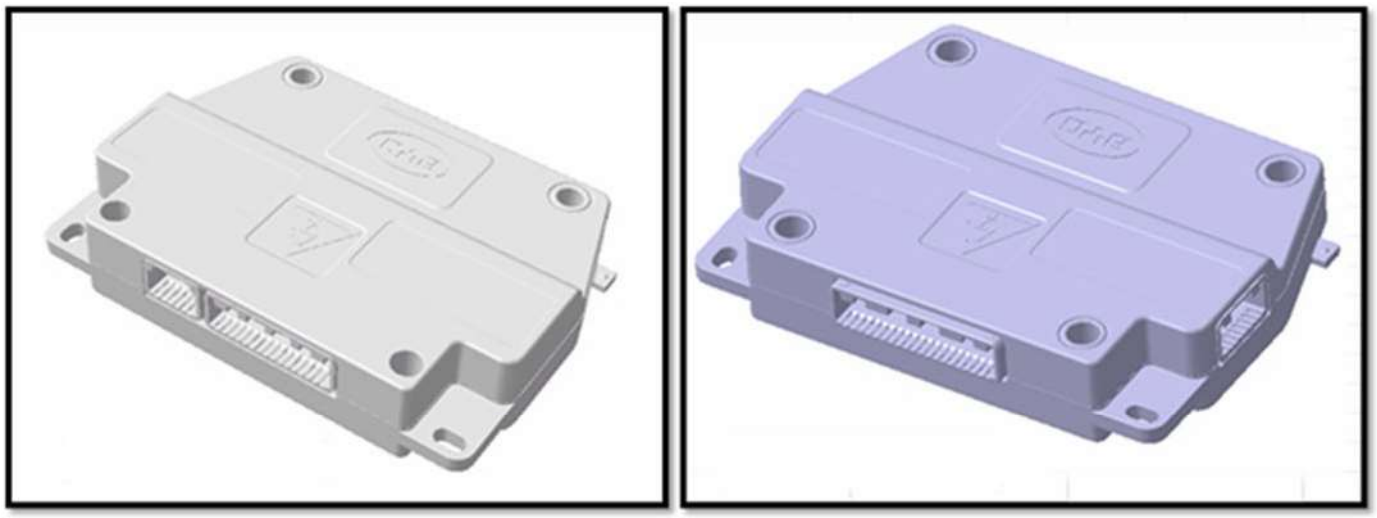

Figure 15: Auxiliary BMS Controller(s)

In the figure below provides a layout of our K9M bus BMS:

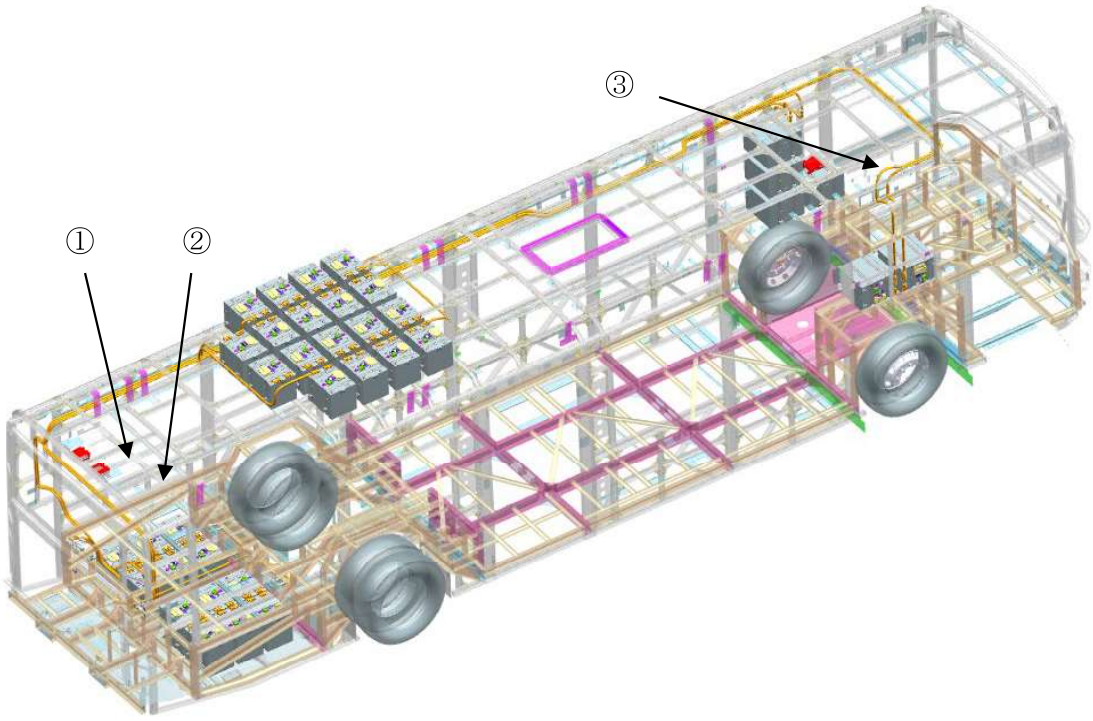

Figure 16: K9M BMS Layout

1. Primary Controller	2. Auxiliary Controller #1	3. Auxiliary Controller #2

Distributed Management Information Collectors Layout.

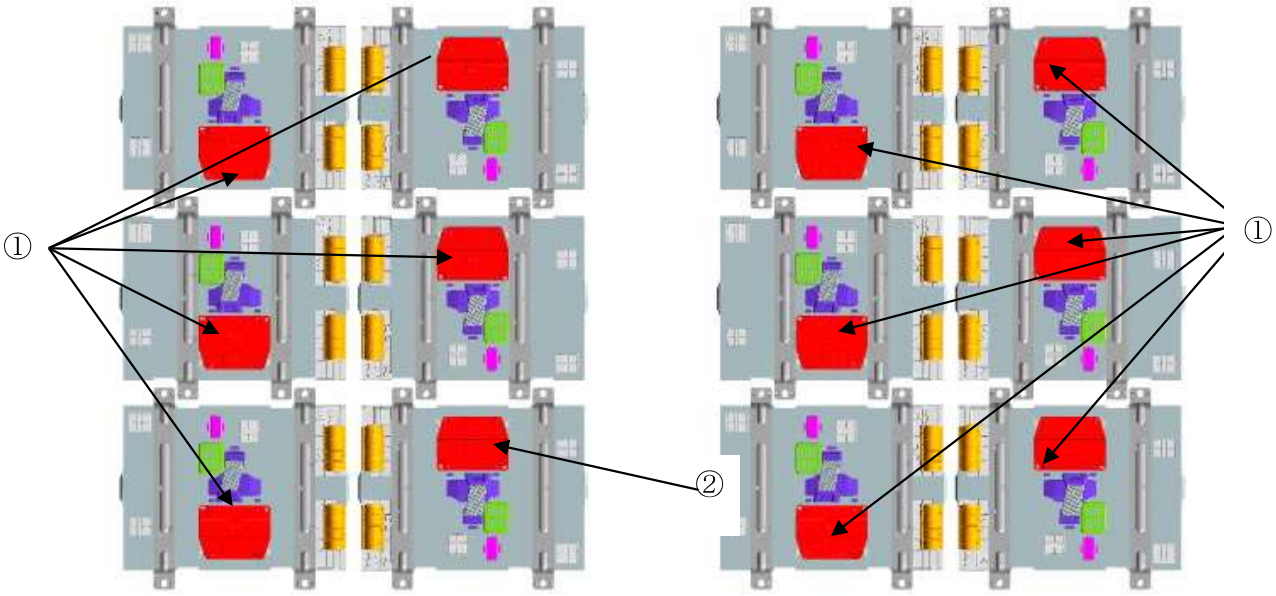

Figure 17: BMS Collector Layout (Underfloor Battery Pack)

1：12 Cell Information Collector
2：12 Cell Information Collector with Terminating Resistor

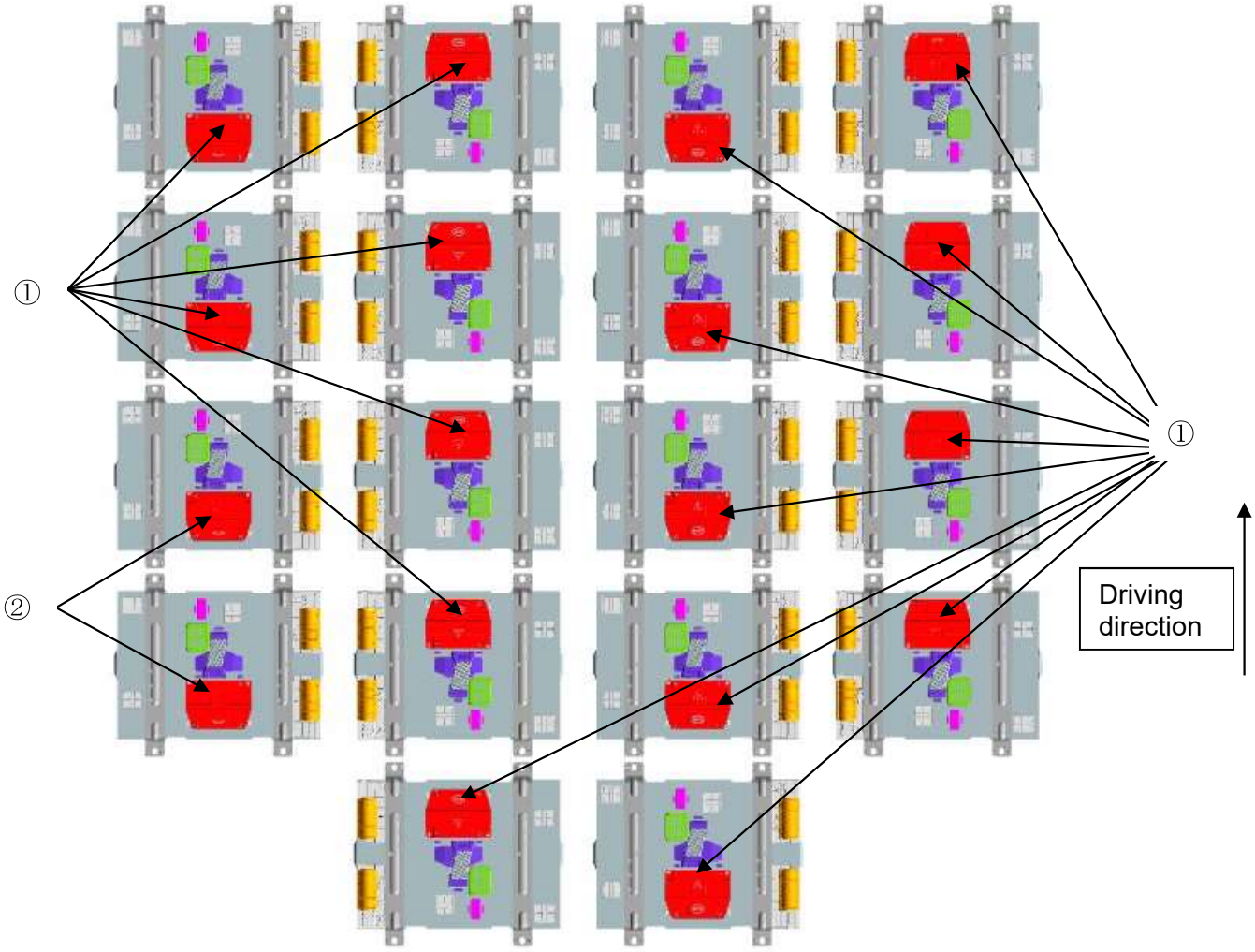

Figure 18: BMS Collector Layout (Roof Top Battery Pack)

1：10 Cell Information Collector

2：10 Cell Information Collector with Terminating Resistor

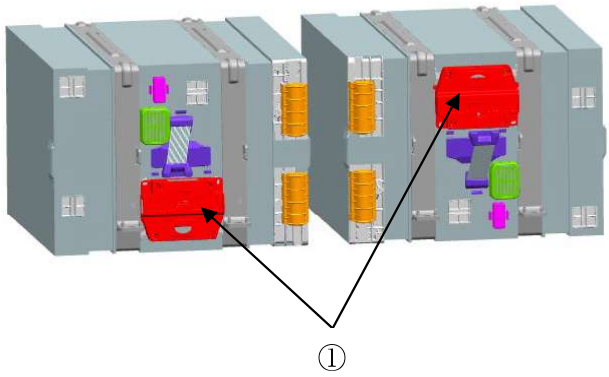

Figure 19: BMS Collector Layout (Right Side Interior Pack)

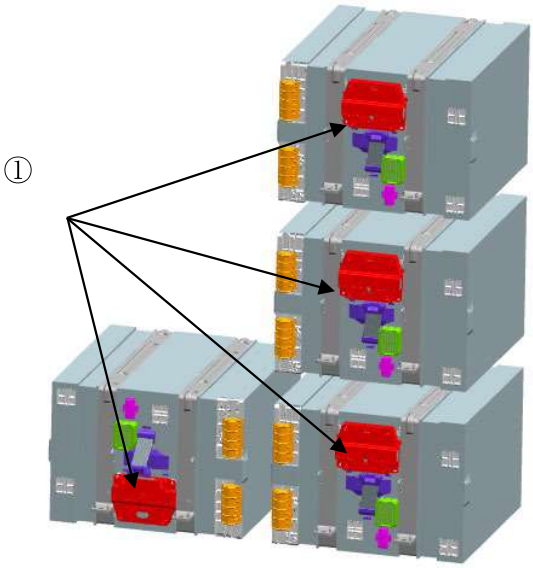

Figure 20:BMS Collector Layout (Left Side Interior Pack)

1. 14 Cell Information Collector

In the series-connected multi-cell battery, the cell with the lowest capacity will determine the duration of the discharge, while the one with the highest capacity will control the capacity returned during the charge. For safety, special controls are used for management of charge and discharge. Typically, the control circuit will address the following items that affect battery life and safety:

- Temperature monitor and control
- Voltage monitor and control
- Current monitor and control
- SOC
- Short circuit protection

The BMS has corresponding actions to take if there are any parameters exceeding the critical set points, to make sure the safety of the battery.

BYD HVB Flame Retardant Design

BYD's HVBs use polymer materials that are flame retardant at the lowest levels (a class UL94 V1). This means that short durations of direct flames will not damage this package (as required by UL).

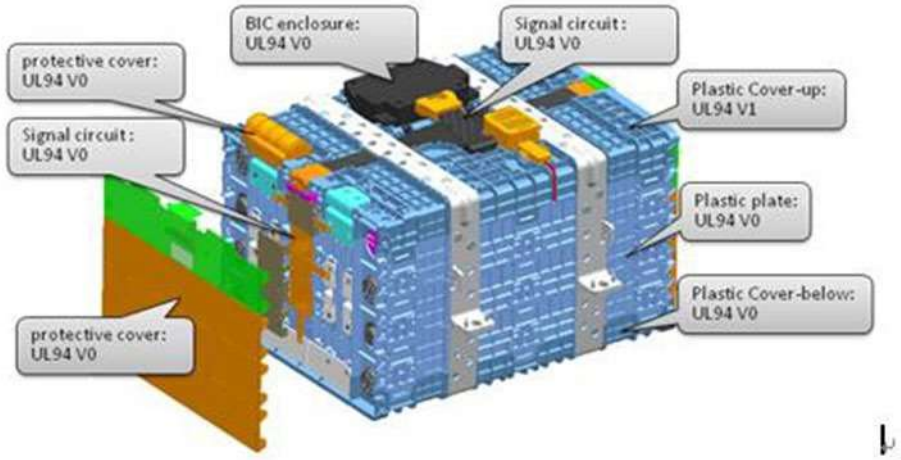

Figure 21: BYD HVB Flame Retardant Design

BYD Signal Circuits

High safety and reliability for the signal circuits can insure that the status of every cell can be monitored real-time. According to the voltage and temperature signals, Battery Management System (BMS) protects the battery very well with control strategy.

- FPC signal line to avoid line intersected, to avoid short circuit of voltage monitoring line inside
- At least one fuse in every voltage monitoring line to protect HVB when short circuit in signal circuit out of HVB
- easy to automate production

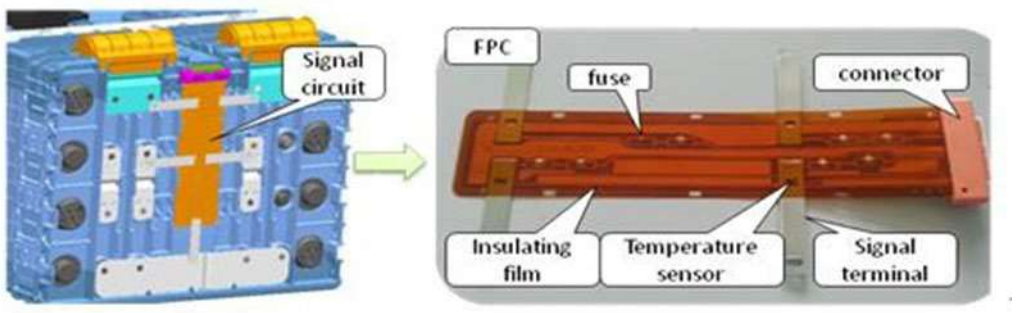

Figure 22: Circuit Layout

BYD Cell Design Conclusion

BYD's Fe Battery cathode is not only the safest cathode material because there is no thermal run-away mechanism nor Oxygen generated when decomposing, it also is the most robust when cycled because there is no net-net volume gain causing premature cell swelling or impedance growth. The Fe Battery is also more tolerant than competitor's batteries for rapid charging with supreme cycle life and C-Rate capabilities. The Fe Battery packs not only meet all of the US regulations, but they also surpass the stringent US DOT and FMVSS vehicle standards. Tests in the following chapters were preformed not only at the vehicle level, but also at the pack and module levels where abuses could more easily be directed, focused and controlled for the worst case evaluations (well beyond the specification requirements). In fact, BYD performs testing beyond required as seen below:

Battery Safety Testing Standards

Impact	Drop	Vibration	Temperature cycling	Insulation resistance	Casing penetration	Forced discharge	Abnormal discharge
Shock	Crush	Projectile	External Short circuit	Molded case heating	Low rate/reverse charging	Separator shutdown	Open circuit voltage
Heating							

Standards Group		UL					IEC		NEMA	SAE	UN	IEEE		JIS	BATSO		BYD
Underwriters Laboratories Inc (UL)	TEST CRITERIA\STANDARD	UL 1642	UL 2054	SU 2271	SU 2580	SU 2575	IEC 62133	IEC 62281	C18.2 M,Pt2	J 2464	Pt.III, S 38.3	IEEE 1625	IEEE 1725	JIS C8714	BATSO 01		Iron-Phosphate
International Electrotechnical Commission (IEC)	External Short Circuit	X	X	X	X	X	X	X	X	X	X	X	X	X			Passes
	Abnormal Charge	X	X	X	X	X	X	X	X	X	X	X	X	X			Passes
National Electrical Manufacturer's Assoc.(NEMA)	Forced Discharge	X	X	X	X	X	X	X	X	X	X	X	X	X			Passes
	Crush	X	X	X	X	X	X		X	X		X	X	X	X		Passes
	Impact	X	X	X	X			X	X		X	X	X				Passes
Society of Automotive Engineers (SAE)	Shock	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Passes
	Vibration	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Passes
United Nations (UN)	Heating	X	X	X	X	X	X		X	X		X	X	X			Passes
	Temperature Cycling	X	X	X	X	X	X	X	X	X	X	X	X	X	X		Passes
Institute of Electrical and Electronics Engineers (IEEE)	Low Pressure (Altitude)	X		X	X	X	X	X	X		X	X	X	X	X		Passes
	Projectile	X	X	X	X							X	X				Passes
	Drop			X	X		X	X	X					X	X		Passes
International Organization for Standardization (ISO)	Continuous Low Rate Charging						X							X			Passes
	Molded Casing Heating Test								X								Passes
	Open Circuit Voltage								X								Passes
Japanese Standards Association (JSA)	Insulation Resistance				X				X								Passes
	Reverse Charge			X	X												Passes
Battery Safety Organization (BATSO)	Penetration			X	X					X							Passes
	Separator Shutdown Integrity									X							Passes
	Internal Short Circuit Test	X			X									X			Passes

Figure 23: BYD Battery Safety Testing Standards

CHAPTER 2: BATTERY SAFETY

Within this chapter, we will present the full results from the specific testing that electric bus battery modules and packs are subjected to and passed.

Vibration/Shaker-Table Testing

BYD simulated roadway vibrations with a vigorous vibration spectrum. The test conditions included; Battery at 100% SOC, frequency range: 10 - 2000HZ. BYD performed the testing with reference to the IEC 60068-2-64 random vibration. BYD used a test duration of over 8 hours for each plane of the test packs. As shown in Figure: Pack after vibration, the module wasn't damaged during and after the vibration test.

Figure 24: Vibration Testing

Thermal Shock Test

BYD tested the reliability of the battery when the vehicle would be operated at extreme temperature ranges. The battery module was charged to 100% SOC, temperature range is 85 ±2°C to -40 ±2°C. Temperatures were cycled with durations of 15 minutes to reach each temperature extreme, then remain soaked for 6 hours or reach uniform temperature. Five (5) cycles were completed, and then the sample was returned to ambient and charged and discharged 2 cycles. The battery module did not catch fire or explode no rupture of enclosure or leakage of electrolyte outside of enclosure – Pack was is still operational (Figure: Thermal Chamber).

Figure 25: Thermal Shock Testing

Salt Spray Test

BYD tested the reliability of the battery when exposed to a high-salt environment, such as somewhere near the ocean or road-way salts. The battery module was charged to 100% SOC. The test conditions included: a constant salt mist: 5% NaCl, PH: 6.5 -7.2, eight (8) test cycles, 7 days for 1 cycle = 56 days of testing. The battery module didn't catch fire or explode, there was no rupture of enclosure or leakage of electrolyte outside of enclosure, and it was still operational as shown in the figure.

Figure 26: Salt Spray Testing

Crush Testing

BYD tested the safety of the battery when the vehicle would be crushed, and the battery is impacted directly. The battery module is charged to 100%SOC and crushed until the module experienced over 100 kN of force. The module didn't catch fire or explode, but was rendered non-functional.

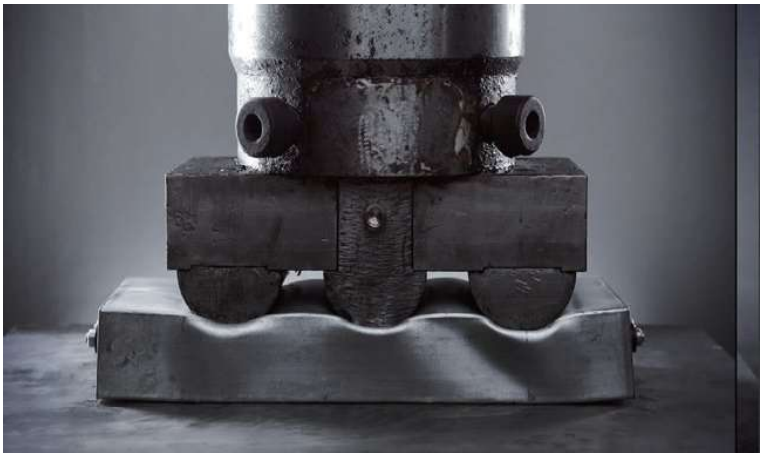

Figure 27: Crush Testing

Short-Circuit Testing

BYD tested the safety of the battery when all the PCBA protection circuit devices failed to work, and the battery was “hard” short current. The battery module was charged to 100%SOC and a short across the battery with a total resistance of less than $\leq 5\ m\Omega$. The module didn’t catch fire or explode, but was rendered non-functional.

Figure 28: Short Circuit Testing

Pack Level Tests

Collision Test

BYD tested the safety of the entire battery packs simulating when a vehicle collided with objects at different speeds. In this test, the collision could be inflicted directly on the pack without protection from aluminum cages or bus body materials. The test conditions and the results are shown in Figure. The pack did not catch fire or explode, but was rendered non-functional.

	SOC : 100% Inbreak Angle : rear-end collision Speed : 20Kmph	SOC : 100% Inbreak Angle : rear-end collision Speed : 64 Kmph
Photo		
Result	Lightly destroyed No fire, No exploding	Smoking No fire, No exploding

Figure 29: Collision Testing

Short Current Test

BYD tested the safety of the entire battery pack when all the in-line protection devices failed to work, and the battery was placed into a “hard” short circuit condition. The battery pack was charged to 100% SOC, short circuited with the battery total resistance less than $\leq 5\ m\Omega$. The pack did not catch fire or explode, but was rendered non-functional.

Figure 30: Short Circuit Testing

One Hour Fire Simulation Test

No other manufacturer conducts an abuse test like what will describe now, or if they do, they do not report the results, because they all know that of any the chemistries already compared above – Only the BYD chemistry will not explode. The Fire simulation test will estimate the safety of the battery in the most extreme condition that the vehicle has caught fire from some external combustion source. The battery pack was charged to 100%SOC, and then burned for a period of 1 hour. The BYD pack did not catch fire or explode with the test conducted for just one hour, but is normally rendered non-functional.

Gas Flaming Test—Total Consumption of Pack (Unlimited Time)

The BYD Iron-Phosphate battery is explosion proof even when placed in direct flames. BYD have tested these cells, modules and entire battery packs in harsher conditions than any competitor. The individual cells, modules and pack-casings may be consumed, the separators melt, the plastic components of the battery and organics will be consumed in the flames, but there is no risk of flying debris or shrapnel as is common in other EV batteries due to cascading failures of thermal events. Again, no other manufacturer will conduct an abuse test like the following. The Gas Flaming Test, a total consumption test, tests the ultimate safety and stability of the battery and chemistry in the most extreme condition that the vehicle is continually bombarded with flame from an external source. The battery pack was charged to 100% SOC, and burnt until the entire pack is consumed in the flame and any flames from the ashes have died out. The BYD pack will clearly catch fire and ash (as wanted); however, in no case will the pack explode.

Figure 31: Flame Testing

Official Certifications

The battery used in the BYD electric buses and the e6 has achieved certifications by UL and CQC.

CHAPTER 3-BATTERY CYCLE LIFE

Cycle Life Testing

The BYD Iron-Phosphate has achieved an industry benchmark in cycle life because it has overcome some of the most common failure-modes. In many Li-Ion batteries, when the cell charges and discharges anode undergoing oxidation and the cathode experiencing reduction there is a net-net volume gain causing increased pressures to build up in the cell layers as the cell is cycled. Eventually the layers “swell” so much that the pressure at the separator is so extreme that the electrolyte is pushed out of the gaps and electrolyte starvation occurs. This phenomenon immediately reduces the recoverable capacity of the cell and it dies very quickly. Because BYD’s Iron-Phosphate has the same crystal lattice between LiFe1-xCoxPO4 and Fe1-xCoxPO4, there is only a minute volume change (from m0.2914 nm3→0.2724 nm3). In fact, the oxidation capability of Fe1-xCoxPO4 is low that it results in no net-net volume gain during cycling. Therefore, the degradation curves shown in a normal cycle life format are very straight and predictable. There is no other chemistry that does this. All others show a rapid drop-off or “knee” on the curve when nearing the end-of-life at about 80% of the original capacity.

BYD has continuously been cycling our very large individual modules (multiple cells in each) for many years. As shown in Figure: Multi-Cell Module Cycling Results, after 9,500 cycles, the battery capacity still remains at over 70.7% and the degradation curve is much more stable than any competitor’s modules. This data was collected on a series of many modules all performing similarly – 6 cycles of charging and discharging were completed daily and this 9,500-cycle test has currently taken 5 years to get the data shown below.

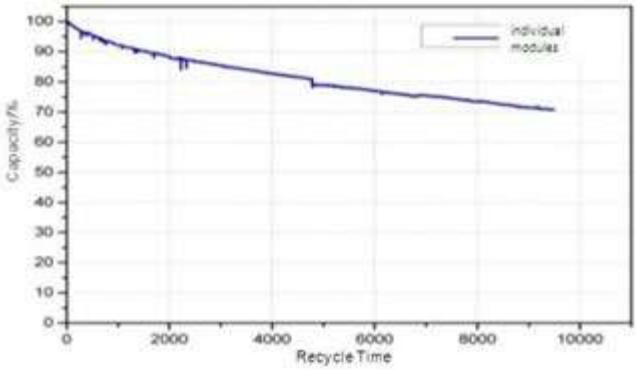

Figure 32: Multi-Cell Module Cycling

Whole vehicle packs (with multiple modules) have been tested under continuous load, raising the surface temperature of the modules to about 40C. However, even under these harsh conditions, the capacity has remained at over 85% after 2,000 cycles, and over 75% after 4,000 cycles.

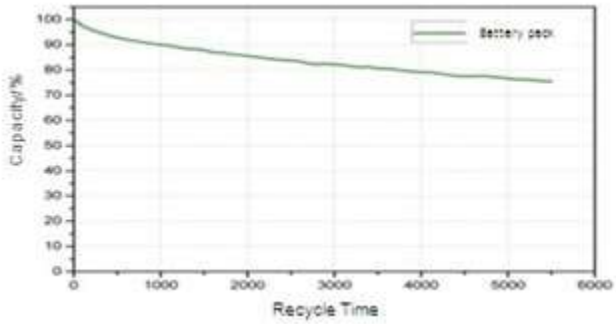

Figure 33: Pack Cycling Results

The best case laboratory cycling tests are shown with Single cells. BYD have shown that these achieve well over 10,000 cycles, and the cell capacities can still reach 70% of the initial capacity. 10,000 single cell cycle testing includes six cycles each day. Five years of this testing has resulted as follows:

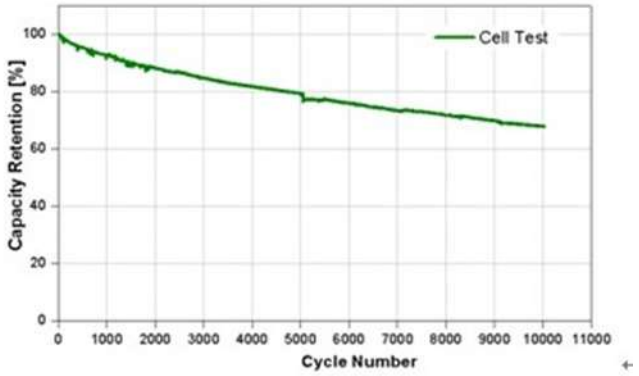

Figure 34: Single Cell Cycling

CHAPTER 4-BYD FE BATTERY ENVIRONMENTALLY FRIENDLY FEATURES

BYD's Iron-Phosphate batteries contain no toxic electrolytes, no heavy metals in either the cathode or the anode and are not manufactured with any caustic or harmful materials. This is the world's first environmentally-friendly, high energy density, and rechargeable chemistry! The BYD electric bus is also outfitted with LED lighting, the highest efficiency lighting available.

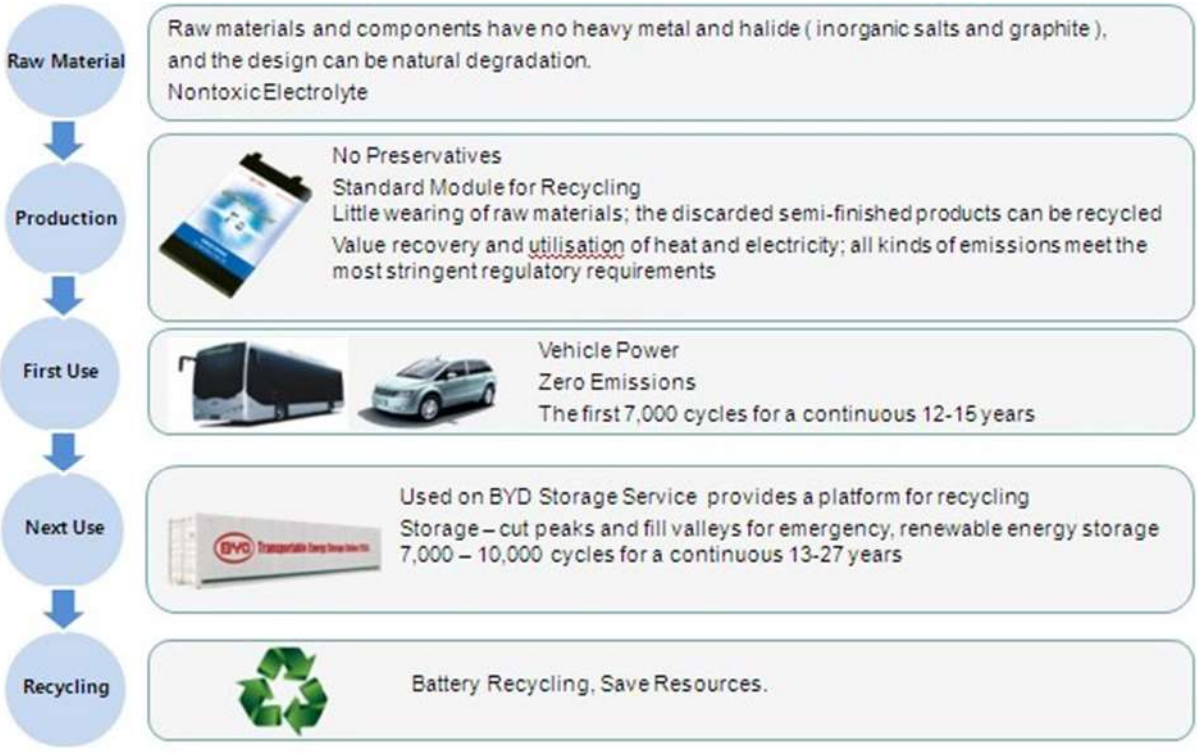

Figure 35: BYD Environmentally Friendly Features

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WHITE PAPER:
BYD BATTERY ELECTRIC BUS SAFETY FEATURES AND OPERATION

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June 22, 2017 Rev 3a

EXECUTIVE SUMMARY

BYD has always placed a premium on safety. From the world's first, and still only, vehicle battery specifically formulated to not be susceptible to thermal runaway and fire, to a track record of over 10,000 electric buses deployed worldwide and over 130 million miles of safe, reliable and incident-free accumulated service, BYD has repeatedly demonstrated its commitment to safety.

This white paper focuses on the three tenets of Electric Vehicle (EV) safety:

1. **Battery pack safety and protection;**
2. **Passenger, Operator, and Technician protection, via High-Voltage leak detection and safety shutdown; and**
3. **Charging operation ground-fault detection and shutdown.**

These safety-systems areas are described in detail, and, where applicable, demonstrated: by creating the specific fault and documenting the correct shutdown sequence as it transpires.

This white paper is structured as follows:

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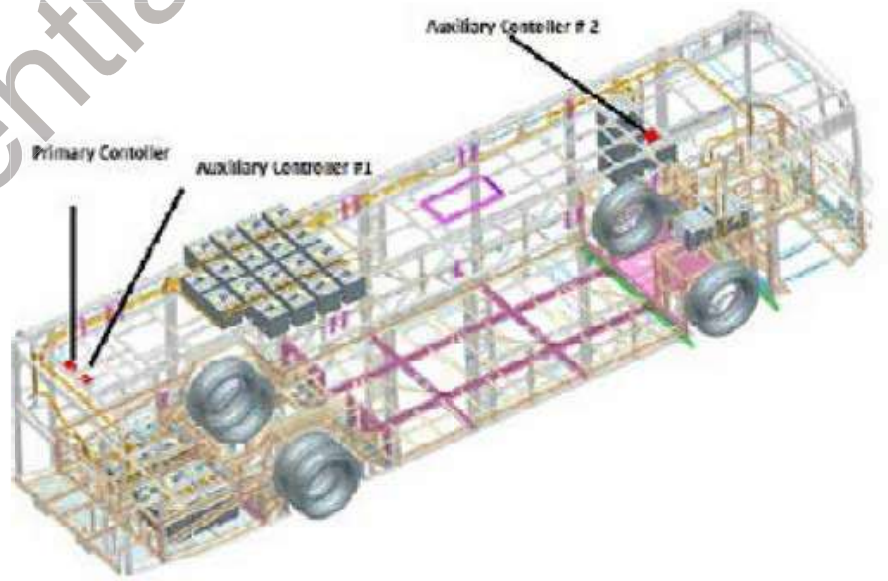
1. BATTERY PACK SAFETY

OVERVIEW: ESS CONFIGURATION & COMPONENTS

Battery distribution across the bus optimizes weight balance and space for other components and seating.

Even though there are actually four (4) physical locations on the K9 bus for Energy Storage System (ESS) ***battery compartments (battery subpacks)***, there are only two (2) distinct ESS ***battery packs*** on each K9. Each pack has its own ***battery controller;*** these controllers are then each connected to a separate ***Primary Battery Controller.*** This distribution of elements on the K9 is shown below.

Figure 1. Location of Packs and Controllers on the K9M [note: get better quality picture and add notes as to pack and subpack distribution; check against other sources and text in here first.]



Each of these subpacks and packs is made up of ***battery modules***; each module is made up of a varying number of ***battery cells.*** These levels (cell, module, pack) are shown below.

Figure 2. Battery Cell, Module, and Pack

In **Figure 2** above, note the red squares on the module and the pack: these are ***data sensors/collectors.*** Each module one (1) data sensor/collector, which continually monitors temperature and voltage for the cells in that module, and feeds this information back to the pack's controller—which in turn shares it with the Primary Battery Controller as needed.

The data sensors/collectors and the controllers form the "brain" of the ***Battery Management System (BMS)***, but perhaps the most important part is the "muscle": the ***Battery Safety/Protection System,*** which shuts down individual sections of the battery packs, while the other sections can continue to operate.

Crucial components of this system are the ***voltage divider/contactors,*** which are located inside of each battery compartment, and which can open and close the High Voltage circuit, and can also keep any live part inside of the battery compartment when shutting down the electricity.

The K9 has six (6) voltage divider/contactors, three (3) each for the two (2) battery packs, distributed across the four (4) battery compartments/subpacks as follows:

- PACK 1 (See **Figure 3** on the next page):
  - **Rear overhang, streetside compartment:** 1
  - **Rear overhang, curbside compartment:** 1
  - **Left front wheelhouse compartment:** 1 [note: other BYD sources say 1/2 rooftop compartment]
- PACK 2 (See **Figure 4** on the next page):
  - **Rooftop compartment:** 2 [note: other BYD sources say 1/2 rooftop compartment]
  - **Right front wheelhouse compartment:** 1

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Figure 2. Voltage Divider/Contactor Layout, Pack 1

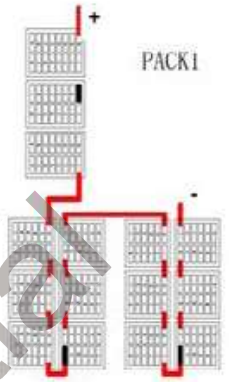
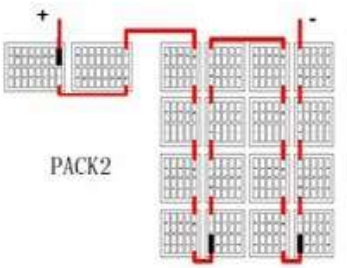


Figure 3. Voltage Divider/Contactor Layout, Pack 2



Since the positive electrode and the negative electrode of every single battery pack are disconnected when the contactor is open, putting the contactors between each of the physical locations that comprise the two packs achieves the same safety outcome as putting the contactor between the positive and negative node of the battery, which is to isolate the positive and negative harness. The failure probability of a voltage divider/contactor is one in one hundred thousand (1/100,000).

SAFETY PROTECTION FEATURES

1. In order to more safely control and use the battery, voltage divider contactors are installed inside of each battery pack (as shown in **Figure 3** and **Figure 4**). If the BMS detects abnormality in the vehicle High Voltage circuit, the voltage divider contactor will automatically open and power down the High Voltage circuit.
2. Several fuses are installed in each battery pack. If the High Voltage circuit is shorted, the fuse will blow first. Since there is at least one fuse inside of each battery pack, there will be zero voltage and current output if the fuse is blown.
3. The battery packs are water tight and rated to seal standard **IP67,** which effectively avoids electricity leakage risk caused by water penetration in to the battery pack. (See **Figure 5** at right.)

Figure 5. The two chassis battery packs are submersed to a depth of 1 meter for 30 minutes, and no water is allowed to enter into the battery pack.

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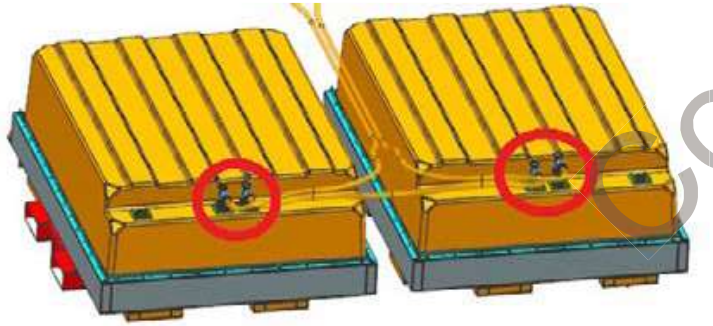
4. Finger-touch-proof ***High Voltage connectors*** are utilized for the positive/negative electrodes of the bottom battery pack. [underside compartments?]

5. There are ***High Voltage warning signs*** on the sealing covers of the bottom battery packs. Non-professionals should not touch. [add note about only BYD technicians to avoid voiding the warranty?]

Figure 5. High Voltage Warning Label

6. There is no opportunity to come in contact with the High Voltage circuits when normally plugging in/unplugging the connectors. When the High Voltage connectors are unplugged, DO NOT TOUCH the exposed High Voltage wires. Use electrical tape to wrap up and seal the connectors immediately. [This confuses me: no opportunity for contact during the act of unplugging, but when the connectors are unplugged, there's exposed wire needing electrical tape?]

Figure 6. High Voltage Connectors in Red



7. The rooftop battery subpacks and front wheelhouse battery subpacks are all securely sealed. High Voltage circuits are not accessible under normal operation. [our other sources say the rooftop and underbody are sealed, but wheelhouse ones are not, but rather protected by the body frame and the battery compartment frame; this is also what the photos suggest. can we confirm? Note: we have a number of photos: a) the sealed pod thing, b) the wheelhouse framework with fireproof insulation, c) its mounting, tie-downs, limiting straps, etc. in the framework, and d) the batteries on the side as visible through the exterior access doors. Should we add any of these?]

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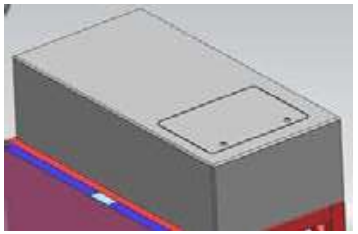
1. BATTERY PACK SAFETY
White Paper: BYD Battery Electric Bus Safety Features and Operation, June 22, 2017 rev3a

Figure 7. High Voltage Circuit Protector



8. The ***"Power System Malfunction" warning light*** will illuminate on the dashboard if there is any electricity leakage on the bus. The vehicle is not able to operate on High Voltage under these conditions. Contact BYD's personnel immediately to solve this issue.

Figure 8. "Power System Malfunction" Warning Light

9. In the underbus compartments, the battery is placed in a battery pack frame. Two protections are therefore available in the instance of a side collision: **a) Body Frame,** and **b) Battery Pack Frame.** [again, other sources say the rooftop and underbody are sealed, but wheelhouse ones are protected by the body frame and the battery compartment frame; this is also what the photos suggest. can we confirm? Also, if the chassis ones are not sealed, they would get extra protection from the chassis frame rather than the body frame, right?]

10. The Battery Management System (BMS) peforms contactor failure detection. If the contactor is not functional, it's not able to power up the vehicle. [If any contactor fails, the whole vehicle won't start?]

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2. HIGH VOLTAGE INSULATION VALIDATION TESTING

This test will conclusively prove that, even in the event of a High Voltage leak:

1. **The bus body is isolated** and cannot shock riders, operators, or technicians; and
2. **The bus immediately detects the leak,** and, depending on the severity, either:
   a) **Triggers an alarm** only, or
   b) **Initiates a shutdown** of the bus and disconnects the HV circuit. [and triggers the alarm?]

The High Voltage and low voltage systems on the bus are electrically isolated from each other. The grounds of the 2 systems do not connect to each other and have a high resistance between them.

In this test, we simulate a ground fault by making a connection between the 2 grounds, by connecting a variable resistor in between. In this way, we can start with a high resistance to show that the system is fine, and then change the resistance to simulate a leakage.

MAKE SURE YOU WEAR HIGH VOLTAGE GLOVES BEFORE THE TESTING!

PURPOSE OF TEST

1. **Prove the bus is High Voltage isolated;** and
2. **Prove the bus can shut itself down automatically** if abnormal electric leakage occurs.

TEST EQUIPMENT

3. ***Resistance Decade Box (Model RDB-10);***
4. ***Multimeter (Fluke 175 True RMS Digital Multimeter).***

PROCEDURES

5. **High Voltage disconnect** (**Figure 9**):
   - Unplug the service switch, and
   - Unplug battery negative terminal 2 (**Pack 2**);

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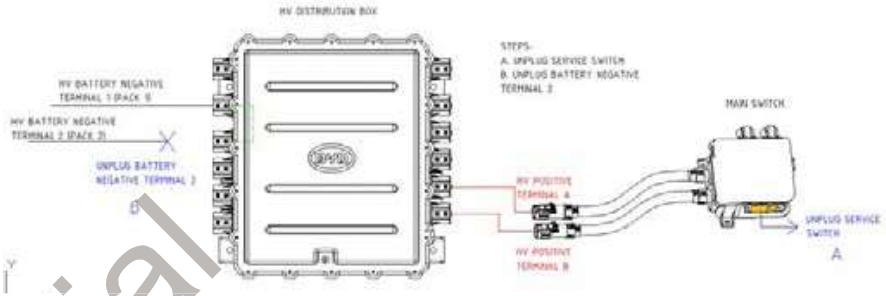
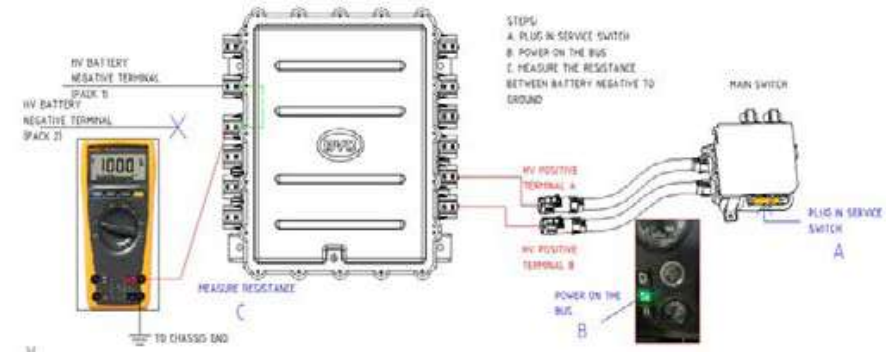
Figure 9: High Voltage disconnect procedure



6. **Test the normal status** (**Figure 10**):
   - Plug in the service switch,
   - Power on the bus,
   - Measure the resistance between battery negative terminal to chassis ground,
   - Ideal value is infinite, and the multimeter will show “OL”;

Figure 10: Test the normal status procedure



The bus will power on with no error (Figure 11) and will have a relatively high resistance value.

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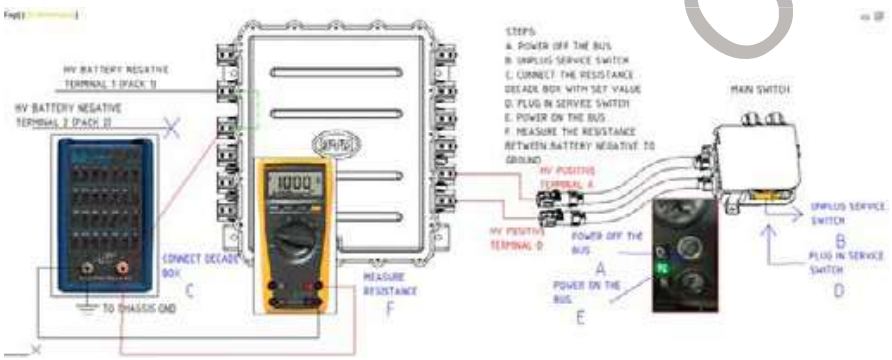
Figure 11: Bus will power on with no error

7. **Simulate leakage** (**Figure 12**);
   - Power off the bus;
   - Unplug the service switch;
   - Connect the resistance decade box with a set value of (500KΩ);
   - Plug in service switch
   - Power on the bus; lower the resistance to 350 KΩ;
   - Log on to HAMS system and check the warning message; there should be a leakage warning on HAMS;
   - Then lower the resistance to 82kΩ;

Figure 11: Simulate leakage



The result will be a leakage error on dashboard as shown below (**Figure 13**), and the bus will shut down automatically after providing the operator 70 seconds to safely pull to the side of the road and come to a safe stop. If the operator is able to safely park the bus before the 70 second timer shuts down the bus the operator has the option to push and hold the start button for 3 seconds which will shut down the bus and disconnect the HV system immediately.

Figure 13: Leakage error on dashboard

CONCLUSION

The test proves that BYD's electric bus is:

1. **High Voltage isolated;**
2. **Integrated with the self-protecting function,** by shutting down itself automatically when the bus is abnormal with serious electric leakage, without any risk of harm.

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3. GROUND FAULT DETECTION AND SHUTDOWN DURING CHARGING

This test demonstrates that the lack of a ground whether prior to charge imitation or during the charging process will inhibit charge initiation or shut charging down as applicable and further described below.

MAKE SURE YOU WEAR HIGH VOLTAGE GLOVES BEFORE THE TESTING!

PURPOSE OF TEST

1. **To demonstrate charge inhibit due to a missing ground;** and
2. **To demonstrate charging discontinued due to loss of a ground.**

PROCEDURES

1. **Demonstrate charge inhibit due to a missing ground:**
   - A. **Remove the ground from each charger,** being sure to wear insulated gloves during the process;
   - B. **Plug both guns into the bus charging ports and push Start** button on charger interface;
   - C. **Confirm display on the charging interface:** it should indicate that Charging is Forbidden;
   - D. **Unplug both charging guns.**
2. **Demonstrate charging discontinued due to loss of a ground:**
   - A. **Replace the ground wire** removed for the previous test, using insulated gloves;
   - B. **Plug in both charging guns and push Start;**
   - C. **Verify that the charging indicator is green or normal** on both the charging interface and the dashboard display screen;
   - D. **Remove the ground from the curbside (C/S) charging port,** wearing insulated gloves;
   - E. **Verify shutdown:** check to be sure that the charging interface and dashboard display both indicate that the C/S charging ground has shut down;
   - F. **Remove the ground from the streetside (S/S) charging port,** wearing insulated gloves;
   - G. **Verify shutdown:** check to be sure that the charging interface and dashboard display both indicate that the S/S charging ground has shut down; and
   - H. **Unplug both charging guns;** the test is complete.

This series of tests will conclusively prove that the BYD Battery Electric bus has been carefully and deliberately designed to be incapable of harming riders, operators and technicians even during electrical malfunctions, and will reliably and consistently disconnect the High Voltage system and shut itself down to avoid danger or harm to its surrounding environment.

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BYD ENERGY

Lancaster, CA

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Material Safety Data Sheet

Date Prepared:
2015-04-16

Section 1 – Product and Company Identification

Product	Lithium Ion Battery
Prior Notice of Usage	You are kindly requested to use the battery which is delivered from BYD COMPANY LIMITED in strict accordance with the specification and operating instructions. Due to improper usage of the battery, fire may occur generating heat, rupture and/or vapors.
Manufacturer	BYD（HUIZHOU） BATTERY CO., LTD.
Address	Xiangshui River, Daya Bay, Huizhou, Guangdong, 516083, P.R. China
TEL	+86-752-5118888
Emergency Telephone	+86-752-5118888

Section 2 - Hazard Identification

Hazard label (CN)	 GB6944 9th Goods
NFPA Rating (USA)	
Other Hazard	A lithium ion battery is normally stable under appropriate handling and storage conditions. If a lithium ion battery generates abnormal heat, leave any confined spaces to avoid inhaling vapors. Chemicals contained in lithium ion or batteries, have some toxicity when combusted.

Section 3 – Composition/Information on ingredients

Hazardous components	CAS#	% (by weight)
$LiCo_xFe_{1-x}PO4(x<3)$	---	18-27
Carbon	7440-44-0	7-16
Electrolyte	---	17-26
PP	---	2.0-3.6
Copper	7440-50-8	7-14
Aluminum	---	16.0-26.0

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Section 4 – First Aid Measures

Skin contact	Remove contaminated clothes and shoes immediately. Wash contact region with soap and plenty of water. Seek medical attention immediately.
Eye contact	Immediately flush eyes with water continuously for at least 15 minutes. Seek medical attention immediately.
Inhalation	Cover the victim in a blanket, move to the place of fresh air. Seek medical attention immediately. When dyspnea (breathing difficulty) or asphyxia (cease of breathing), give artificial respiration immediately.
Ingestion	Get medical aid. Do not induce vomiting. Get medical attention immediately.

Section 5 – Fire Fighting Measures

Suitable Extinguisher	Dry power, sand, carbon dioxide (CO_2).
Unsuitable Extinguisher	Water, water spray.
Specific hazards	Risk of cell case bursting.
Special protective equipment for firefighters	In the event of a fire, wear full protective clothing and self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.
NFPA	Health：0 Flammability：1 Instability ：0

Section 6 – Accidental Release Measures

Personal precautions	Remove personnel from area until it is safe to return. Use personal protective equipment. Avoid contact with skin and eyes.
Environmental precautions	Prevent further leakage or spillage if safe to do so. Do not allow material to contaminate ground water system. Do not throw out into the environment.
Methods for cleaning up	Dilute the leaked electrolyte with water and neutralize with diluted sulfuric acid. Capture the leaked solid material in an appropriate container. Clean affected area with water.

Section 7 – Handling and Storage

Handling	Technical measures: Prevention of user exposure; not necessary under normal use. Prevention of fire and explosion: Not necessary under normal use. Precaution for safe handling: Do not damage or remove the external shell. Specific safe handling advice: Never throw out battery in a fire or expose to high temperatures. Do not soak battery in water. Do not expose to strong oxidizers. Do not give a strong mechanical shock or drop. Never disassemble,

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	modify or deform. Do not short curcuit the terminals with electrically conductive material. In the case of charging, use only dedicated charge or charge according to the conditions specified by the supplier.
Storage	Storage conditions: Avoid direct sunlight, high temperature, and high humidity. Store in cool place (temperature:-10～45℃,humidity: 45～85%). Incompatible products: Conductive materials, water, strong oxidizers and strong acids. Packing material: Insulative and tear-proof, waterproof materials are recommended.

Section 8 – Exposure Controls and Person Protection

Occupational exposure limits	N/A
Engineering controls	N/A
Eye protection	When handling leaking batteries. Wear appropriate protective eyeglasses or chemical safely goggles as described by OSHA’s eye and face protection regulations in 29 CFR 1910 or European Standard EN166.
Skin protection	Use neoprene, rubber or nitrile gloves when handling leaking batteries to prevent skin exposure.
Clothing	Wear appropriate protective clothing to minimize contact with skin.

Section 9 – Physical and Chemical Properties

Appearance and odor	N/A
PH	N/A
Flash point(℃)	N/A
Melting point (℃)	N/A
Boiling point (℃)	N/A
Relative density (water=1)	N/A
Relative Vapour density (air=1)	N/A
Vapour pressure (KPa)	N/A
Heat of combustion (KJ/mol)	N/A
Auto-ignition temperature (℃)	N/A
Solubility	Insoluble in water
Lower explosive limits % (V/V))	N/A
Upper explosive limits % (V/V)	N/A
Appearance and odor	N/A
PH	N/A
Flash point(℃)	N/A
Melting point (℃)	N/A
Boiling point (℃)	N/A

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Section 10 – Stability and Reactivity

Stability	Product is stable under storage conditions described in Section 7.
Incompatibilities	Strong oxidizing agents, acids.
Conditions to avoid	Direct sunlight, high temperature and high humidity. Do not heat above 100℃ (212℉), incinerate, or expose contents to water.
Hazardous Polymerization	Will not occur.
Hazardous decomposition	When a battery is heated above 212℉ by the surrounding fire, acrid or harmful vapors may be emitted.

Section 11 – Toxicological Information

None, unless internal materials are exposed and heated. Toxic information is available on the ingredients noted in section 2. In case of internal gas released or electrolyte spilled, electrolyte and organic solvents has minimal toxicity and may cause irritation of skin or eyes. Released gas may also cause irritation of skin of eyes.

Section 12 – Ecological Information

Ecological toxicity	No data available.
Environmental	Since the cell is composed of non-degradable components; Do not throw out into the environment.
Bioaccumulation	No information.

Section 13 –Disposal Considerations

Disposal measures	Battery recycling is encouraged. Do not dump into any sewers, on the ground or into any body of water. Dispose of the batteries in accordance with local, state and federal laws and regulations. Batteries should be discharged fully prior to disposal. Components as described in Section 1 can be recycled.

Section 14 – Transportation

UN Number	UN3480
PROPER SHIPPING NAME	Lithium Ion Batteries
Packaging Group	Ⅱ
sea contamination	None
Land transport（ADR/RID）	Class 9
Sea transport（IMDG）	Class 9
Air transport（ICAO-TI/IATA DGR）	Class 9

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National regulations	National regulations for transport land GB12268 This battery type is classified as dangerous goods for transport, because the watt-hour rating of the battery exceeds 100 Wh. We also declare that this battery type meets the requirements of each test in the UN Manual of tests and Criteria Part III, Subsection 38.3 (ST/SG/AC.10/11/Rev.4)

Section 15 – Regulatory Information

Major applicable regulations for the transportation of lithium-ion cells and batteries are as follows:

The UN Model Regulations, United Nations ST/SG/AC.10/1/Rev 16. Recommendations on the Safe Transport of Dangerous Goods
The International Civil Aviation Organization (ICAO) Technical Instructions for the Safe Transport of Dangerous Goods by Air Transport
The International Air Transport Association (IATA) Dangerous Goods Regulations (52st Edition 2011)
International Maritime Organization (IMO) International Maritime Dangerous Goods Code (IMDG Code) Amdt. 34-08 2008
OSHA Hazard communication standard (29 CFR 1910)

_____Hazardous _____√_____Non-hazard

Section 16 –Other Information

The information contained in this Safety data sheet is based on the present state of knowledge and current legislation.
This safety data sheet provider guidance on health. Safety and environmental specs of the product and should not be construed as any guarantee of technical performance or suitability for particular applications.

Company	BYD（HUIZHOU） BATTERY CO., LTD.
Address/Tel	Xiangshui River, Daya Bay, Huizhou, Guangdong, 516083, P.R. China /+86-752-5118888
Approved by	Liu Bo
Date issued	2011-06-09

The material safety data sheet is furnished to every manufacturer as a reference to secure the safe handling of chemical. Every manufacturer is requested to carry out appropriate actions for chemical handling as their own responsibility. The supplier makes no warrantee, either express or implied. Concerning of this products，User assumes all risks resulting from its use.

Confidential

WRITTEN CONFIRMATION FROM BATTERY MANUFACTURER

BYD Energy
170 BYD Energy Road
Lancaster, CA 93535

661.940.3250
213.748.3945 fax
www.byd.com

September 21, 2021

BYD Energy attests to the safety of the proposed battery system in the application of the electric buses for the models listed below. BYD Energy is the manufacturer of the proposed battery system used in all BYD bus models that include but not limited to the following:

- K7M
- K8M
- K9M
- K9MD
- C10M
- K11M

Furthermore, we certify that the RESS (Rechargeable Energy Storage System) manufactured by BYD Energy for BYD bus models as listed above has been built, designed and manufactured for use in all on-road and off-road vehicle applications.

Regards,

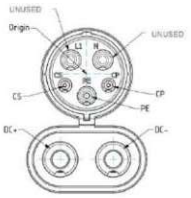
Simon Hu
General Manager

BYD ELECTRIC VEHICLE CHARGING EQUIPMENT

BYD CHARGERS







Charger	40 kW	80 kW	100 kW	200 kW	150 kW DC
Price	$2,500	$8,000	$20,000	$30,000	TBD
Charging Mode	AC	AC	AC	AC	DC
Input Voltage	480V 3-phase	480V 3-phase	480V 3-phase	480V 3-phase	480V 3-phase
Operating Voltage Range	432V-528V 3-phase	432V-528V 3-phase	432V-528V 3-phase	432V-528V 3-phase	456V-504V 3-phase
Continuous Input Current	48A	96A	120A	240A	180A
Recommended Circuit Breaker Capacity	100A	160A	200A	400A	TBD
Input Power	40kW	80kW	100kW	200kW	150 kW
Frequency	60Hz	60Hz	60Hz	60Hz	60Hz
Output Voltage	432V-528V 3-phase	432V-528V 3-phase	432V-528V 3-phase	432V-528V 3-phase	400VDC - 850 VDC
Output Current	48A	48A per coupler	120A	120A per coupler	200A
Output Power	40kW	40kW per coupler	100kW	100kW per coupler	150 kW
Charging Coupler Type	IEC62196-2	IEC62196-2	IEC62196-2	IEC62196-2	Combo 1
Wires	3 hot; 1 neutral; 1 ground	3 hot; 1 neutral; 1 ground	3 hot; 1 neutral; 1 ground	3 hot; 1 neutral; 1 ground	3 hot; 1 neutral; 1 ground
Width	15.75in	15.75in	19.69in	19.69in	31.5in
Depth	7.87in	7.87in	15.75in	15.75in	39.4in
Height	27.17in	27.17in	78.74in	78.74in	87.8in
Charging Cable Length	118.11in	118.11in	118.11in	118.11in	118.11in
Mounting Method	Wall-mounted	Wall-mounted	Floor-mounted	Floor-mounted	Floor-mounted
Short-circuit Protection	x	x	x	x	x
Overheat Protection	x	x	x	x	x
Lightning Protection	x	x	x	x	x
Certification	TUV	TUV	CQC/TUV	CQC/TUV	UL Listed*
Reference Standard	IEC61851/IEC62196	IEC61851/IEC62196	IEC61851/IEC62196	IEC61851/IEC62196	SAE J1772
Enclosure Protection	IP55	IP55	IP54	IP54	IP54
Operating Temperature	-22 to +122 deg F	-22 to +122 deg F	-22 to +122 deg F	-22 to +122 deg F	-22 to +122 deg F
Surrounding Humidity	5-95%	5-95%	5-95%	5-95%	5-95%
LED Indicators	Power, Connect, Charging, Complete, Error	Power, Connect, Charging, Complete, Error	Power, Connect, Charging, Complete, Error	Power, Connect, Charging, Complete, Error	TBD
LED Screen	SOC, Est Time to 100% SOC, ID, Charging Volume, Error	SOC, Est Time to 100% SOC, ID, Charging Volume, Error	SOC, Est Time to 100% SOC, ID, Charging Volume, Error	SOC, Est Time to 100% SOC, ID, Charging Volume, Error	TBD

1

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Critical Characteristic

- Market Target – Medium/Heavy-Duty Commercial High-Battery-Capacity Battery Electric Vehicles
  - ✓ Major BEV (Battery Electric Vehicle) market in the US is at non-commercial light-duty BEV

- Performance
  - ✓ EVSE Power-Output to its Weight Ratio is higher than the OEM or Vender in North America
  - ✓ EVSE Output Power:
    - 80kW AC EVSE: ≤ 80kW (2 x 40kW)
    - 200kW AC EVSE: ≤ 200kW (2 x 100kW)
    - 150kW DC EVSE: ≤ 150kW (120 ~ 140 kW)

    (US Market prefer SAE J1772 as the standard for BEV EVSE. Single-phase AC EVSE is recommended in the standard. The charging power is limited under 20kW. SAE J3068 was just published for three-phase AC EVSE in 2018.)
  - ✓ Coupler Connector Standard: IEC 62196-2 (SAE J3068 AC_6)

    (US Market prefer SAE J1772 AC/CCS connector)
  - ✓ 2-Gun Charging simultaneously

- Function
  - ✓ A part of the VtoG supply chain

    (As a part of BYD advanced VtoG technology, VtoG cannot be functionized with BYD charger)

Category

1) **3-Phase AC or DC Charging:** SAE J3068_201804

Electric Vehicle Power Transfer System Using a Three-Phase Capable Coupler

2) **DC or 1-Phase AC Charging:** SAE J1772A_201710

SAE Electric Vehicle and Plug-in Hybrid Electric Vehicle Conductive Charge Coupler

3) **Wireless/Inductive Charging:** SAE J2954B_201904

*Wireless Power Transfer for Light-Duty Plug-in/Electric Vehicles and Alignment Methodology*_(3.7 / 7.7 / 11 / 22 kW)

- SAE J2954/2_WIP

  *Wireless Power Transfer of Heavy Duty Plug-in/Electric Vehicles and Positioning Communication*_(up to 200kW and beyond)

4) **Overhead/Portal Charging:** SAE J3105_WIP

Electric Vehicle Power Transfer System Using Conductive Automated Connection Devices (ACD)

- SAE J3105/1_WIP - *Infrastructure-mounted Pantograph (Cross-Rail) Connection*
- SAE J3105/2_WIP - *Vehicle-mounted Pantograph (Bus Up) Connection*
- SAE J3105/3_WIP - *Enclosed Pin and Socket Connection*

AC Charging (3-Phase AC or DC / Plug-in)

BYD 3-Phase AC EVSE

- Rated Voltage: 3-Phase, 277Y/480 V_{AC}, 60 Hz
- Higher Power AC Charging: 2-Gun/1-Vehicle Charging Capability
- Bi-Directional Power Flow and Emergency Power Back-Up Component (VtoG)

1. *40kW / 80kW Wall-Mounted AC EVSE* (Not UL Listed / IEC Certified)
   - ✓ Max Output Current (A_{AC}): 48_{40kW} / $96_{80kW\_(2\times48A)}$
   - ✓ Connector Type: SAE J3068 AC_6 (or IEC 62196 Type 2)
   - ✓ Efficiency: 94% (refer to 80kW EVSE)
   - ✓ Weight (lb): 62 / 66
2. *100kW / 200kW Floor-Mount AC EVSE* (Not UL Listed / Not IEC Certified)
   - ✓ Max Output Current (A_{AC}): 120_{100kW} / $240_{200kW\_(2\times120A)}$
   - ✓ Connector Type: BYD Standard (refer to IEC 62196)
   - ✓ Efficiency: 90% (refer to 200kW EVSE)
   - ✓ Weight (lb): 287 / 397

3-Phase AC and DC EVSE in North America

- Major US Market prefer following SAE J1772 as the standard for LD EVSE.
- Single-phase AC EVSE is determined in the standard as AC Level 1 & 2.
- Charging Power: Limited Under 20kW (SAE J1772).
- Connector Type: SAE J1772 AC
- Single-Gun Charging

DC Charging (DC or 1-Phase AC / Plug-in)

BYD 150kW Floor-Mounted DC EVSE

Rated AC Voltage: 3-Phase, 277Y/480 V_{AC}, 60 Hz

Rated AC Current: 188 A_{AC}

Output DC Voltage Range: 400 ~ 850 V_{DC}

Max Output DC Current: 200 A_{DC}

Max Output Power: 150 kW

Connector Type: CCS1 – SAE J1772 over PLC

Efficiency: 97%

Weight (lb): ≈ 2315

- Integrated High Power DC EVSE
- Output Power: ≈ 120 ~ 140 kW

  Limited by the Power Battery Voltage Platform in according to the vehicle model
- WIP
  - ➢ UL Listed
  - ➢ 300kW BYD DC EVSE
  - ➢ 2-Gun/2-Vehicle Charging Capability
  - ➢ Bi-Directional Power Flow and Emergency Power Back-Up

DC Charging (DC or 1-Phase AC / Plug-in)

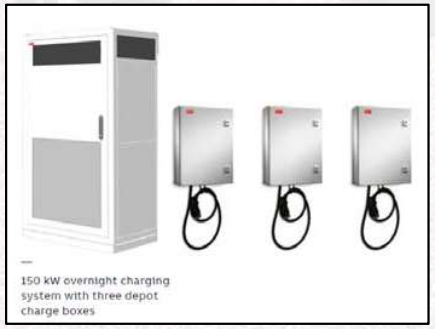
DC EVSE in North America

(Too many DC EVES OEM/Vendor in North America. BYD currently ONLY has worked with ChargePoint /ABB/SIEMENS)

1. ChargePoint
   - ✓ CPE250 _ 62.5 kW
   - ✓ Express Plus _ up to 500 kW
     (Announced)
2. ABB
   - ✓ HVC 150C _ 150 kW
   - ✓ Terra HP _ 350 kW (500A liquid-cooled cable)
     (Announced)
3. Tesla Supercharger
   - ✓ V2 _ 120 kW
   - ✓ V3 _ 250kW
     (Announced)

- Modularized Design

- Single-Gun Charging
- Tendency (refer to ABB)
  - ➢ AC Level 1:1 kW or less
  - ➢ AC Level 2: 3 ~ 19 kW
  - ➢ DC : 20 ~ 25 kW
  - ➢ DC Fast: 50kW
  - ➢ DC High Power: 150kW+
- Connector Type
  - ➢ CCS1 – SAE J1772 over PLC
  - ➢ CCS2 — IEC 61851-23 over PLC
  - ➢ CHAdeMO – JEVS G104 over CAN



Wireless/Inductive Charging

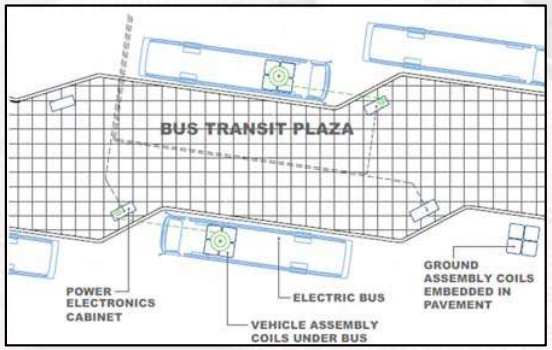
- ❑ Increase/extend vehicle operating hour and range
- ❑ Vehicle can be charged on “OK” Mode
- ❑ Vehicle location and alignment required
- ❑ All weather condition
- ❑ Larger Ground Assembly (GA) need to be build at the bus station or fleet

1) MD (Momentum Dynamics)

- Power Level (Determined by the QTY of charging pads)
  Max 75 kW per pad (One to four or more pads)
- External Liquid-Cooled System Required
- Charging Automatically

2) WAVE (Wireless Advanced Vehicle Electrification)

- Power Lever: 50kW ~ 200kW
- One Charging Pad
- Rectifier Installation Required



Build Your Dreams

Overhead/Portal Charging

- ❑ 3 Types of Connections
  - Infrastructure-mounted Pantograph(Top-down Pantograph)
  - Vehicle-mounted Pantograph (Bottom-up Pantograph)
  - Enclosed Pin and Socket
- ❑ High Power Charging System
  150 / 300 / 450 kW | 600kW (Announced)
- ❑ Vehicle location and alignment required
- ❑ Additional off-board power control system need to be installed

1) HELIOX OC 300kW Cross-Rail

2) SIEMENS Sicharge UC 450kW Inverted Pantograph

COMPREHENSIVE WARRANTY TERMS

ALTOONA TEST REPORTS

30-FT ALTOONA TEST

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration U.S. DOT
In accordance with CFR 49, Volume 7, Part 665

Manufacturer: BYD Motors Inc.
Model: K7

Submitted for Testing in Service-Life Category
12Year /500,000 Miles

April 2017

Report Number: LTI-BT-R1605

PENNSTATE

THE LARSON INSTITUTE

The Thomas D. Larson
Pennsylvania Transportation Institute
201 Transportation Research Building
The Pennsylvania State University
University Park, PA 16802
(814) 865-1891

Bus Testing and Research Center
2237 Old Route 220 North
Duncansville, PA 16635
(814) 695-3404

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration U.S. DOT
1200 New Jersey Avenue, SE
Washington, DC 20590

In accordance with CFR 49, Volume 7, Part 665

Manufacturer: BYD Motors Inc.

Manufacturer's address: 46147 BYD Blvd.
Lancaster, CA 93534

Model: K7

Submitted for Testing in Service-Life Category
12 Year /500,000 Miles

Report Number: LTI-BT-R1605

ACCREDITED
Mechanical Testing Certificate 3172.01

Quality Authorization | Director, Bus Research and Testing Center (Title) | 4/3/17 (Date)

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EXECUTIVE SUMMARY

BYD Motors Inc. submitted a model K7, electric-powered 23 seat (including the driver) 30-foot bus, for a 12 yr/500,000 mile STURAA test. The odometer reading at he time of delivery was 2,460 miles. Testing started on February 26, 2016 and was completed on March 27, 2017. The Check-In section of the report provides a description of the bus and specifies its major components.

The primary part of the test program is the Structural Durability Test, which also provides the information for the Maintainability and Reliability results. The Structural Durability Test was started on March 17, 2016 and was completed on January 17, 2017.

The interior of the bus is configured with seating for 23 passengers including the driver. Free floor space will accommodate 18 standing passengers resulting in a potential load of 41 persons. At 150 lbs per person, this load results in a measured gross vehicle weight of 28,190 lbs. The first segment of the Structural Durability Test was performed with the bus loaded to a GVW of 28,190 lbs. The middle segment was performed at a seated load weight of 25,770 lbs and the final segment was performed at a curb weight of 21,880 lbs. Durability driving resulted in unscheduled maintenance and failures that involved a variety of subsystems. A description of failures, and a complete and detailed listing of scheduled and unscheduled maintenance is provided in the Maintainability section of this report.

Effective January 1, 2010 the Federal Transit Administration determined that the total number of simulated passengers used for loading all test vehicles will be based on the full complement of seats and free-floor space available for standing passengers (150 lbs per passenger). The passenger loading used for dynamic testing will not be reduced in order to comply with Gross Axle Weight Ratings (GAWR's) or the Gross Vehicle Weight Ratings (GVWR's) declared by the manufacturer. Cases where the loading exceeds the GAWR and/or the GVWR will be noted accordingly. During the testing program, all test vehicles transported or operated over public roadways will be loaded to comply with the GAWR and GVWR specified by the manufacturer.

Accessibility, in general, was adequate. Components covered in Section 1.3 (Repair and/or Replacement of Selected Subsystems) along with all other components encountered during testing, were found to be readily accessible and no restrictions were noted.

The Reliability section compiles failures that occurred during Structural Durability Testing. Breakdowns are classified according to subsystems. The data in this section are arranged so that those subsystems with more frequent problems are apparent. The problems are also listed by class as defined in Section 2. The test bus encountered no Class 1 failures. Of the two Class 2 failures one occurred with an axle and one with the drive system. Of the remaining 21 reported failures 17 were Class 3 and four were Class 4.

The Safety Test, (a double-lane change, obstacle avoidance test) was safely performed in both right-hand and left-hand directions up to a maximum test speed of 45 mph. The performance of the bus is illustrated by a speed vs. time plot. Acceleration and gradeability test data are provided in Section 4, Performance. The average time to obtain 50 mph was 31.01 seconds. The Stopping Distance phase of the Brake Test was completed with the following results; for the Uniform High Friction Test average stopping distances were 29.41' at 20 mph, 57.15' at 30 mph, 96.22' at 40 mph and 127.07' at 45 mph. The average stopping distance for the Uniform Low Friction Test was 31.01'. There was no deviation from the test lane during the performance of the Stopping Distance phase. During the Stability phase of Brake Testing the test bus experienced no deviation from the test lane. The Parking Brake phase was completed with the test bus maintaining the parked position for the full five minute period with no slip or roll observed in both the uphill and downhill positions.

The Shakedown Test produced a maximum final loaded deflection of 0.049 inches with a permanent set ranging between -0.003 to 0.005 inches under a distributed static load of 15,375 lbs. The Distortion Test was completed with all subsystems, doors and escape mechanisms operating properly. Water leakage was observed during the test inside the upper rear corner of the engine compartment and inside the upper rear compartment. All subsystems operated properly.

The Static Towing Test was performed using a target load (towing force) of 26,256 lbs. All four front pulls were completed to the full test load with no damage or deformation observed. The Dynamic Towing Test was performed by means of a front-lift tow. The towing interface was accomplished using a hydraulic under-lift wrecker. The bus was towed without incident and no damage resulted from the test. The manufacturer does not recommend towing the bus from the rear, therefore, a rear test was not performed. The Jacking and Hoisting Tests were also performed without incident. The bus was found to be stable on the jack stands, and the minimum jacking clearance observed with a tire deflated was 3.2 inches.

A Fuel Economy Test was run on simulated central business district, arterial, and commuter courses. The results are available in Section 6.

A series of Interior and Exterior Noise Tests was performed. These data are listed in Section 7.1 and 7.2 respectively.

35-FT ALTOONA TEST

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration U.S. DOT
In accordance with 49 CFR, Part 665

Manufacturer: BYD Coach & Bus, LLC
Model: K8M

Tested in Service-Life Category
12 Year / 500,000 Miles

February 2021

Report Number: LTI-BT-R2020-04

The Thomas D. Larson
Pennsylvania Transportation Institute
201 Transportation Research Building
The Pennsylvania State University
University Park, PA 16802
(814) 865-1891

Bus Testing and Research Center
2237 Plank Road
Duncansville, PA 16635
(814) 695-3404

PennState College of Engineering

LTI BUS RESEARCH AND TESTING CENTER

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration, U.S. DOT
1200 New Jersey Avenue, SE
Washington, DC 20590

In accordance with 49 CFR Part, 665

Manufacturer: BYD Coach & Bus, LLC
Manufacturer's address: 1800 S. Figueroa St.
Los Angeles, CA 90015

Model: K8M

Tested in Service-Life Category
12 Year / 500,000 Miles

Report Number: LTI-BT-R2020-04

David Klinikowski	Director, Bus Research and Testing Center	March 9th, 2021
Quality Authorization	*Title*	*Date*

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EXECUTIVE SUMMARY

TEST HIGHLIGHTS

The information in this report pertains only to this specific bus, as received from the manufacturer for testing.

The Check-In section of the report provides a description of the bus and specifies its major components. The following table gives the salient specifications.

Manufacturer	BYD Coach & Bus, LLC
Model	K8M (See below)
Chassis Make/Model	BYD / K8M
Chassis Modified	No
Length	35 feet, 9.5 inches
Fuel	Battery Electric
Service Life	12 year / 500,000 miles
Number of Seats (including driver)	33 or 24 with 2 wheelchairs
Manufacturer-Designated Standing Passenger Capacity	27
Gross Vehicle Weight used for testing	41,180 lb.
Gross Vehicle Weight Rating as specified with Manufacturer	41,888 lb. / 43,431 lb. (See below)
Mileage at Delivery	3,109
Test Start Date	March 20, 2020
Test Completion Date	December 16, 2020*

***Due to the COVID-19 pandemic, all bus testing activities were suspended during the period of March 26, 2020 through July 16, 2020.**

The measured curb weight was 10,120 lb. for the front axle and 22,000 lb. for the rear axle. These combined weights provided a total measured curb weight of 32,120 lb. There are 33 seats including the driver and free floor space for 31 standing passengers bringing the potential total passenger capacity to 64. However, a placard shows the maximum number of standing passengers as 27. Therefore, the gross load represents 33 seated passengers and 27 standing passengers, for a total of 60 passengers. Gross load is calculated as 150 lb. x 60 = 9,000 lb. The measured gross vehicle weight was 41,180 lb. There is a potential to overload the rear axle with the additional available floor space for standing passengers.

This bus was submitted with a VIN plate that showed a GVWR of 41,888 lb. The GVW for testing was calculated as 41,180 lb. based on the configuration of the bus as delivered and did not exceed the rear GAWR. However, at the end of the test, the manufacturer requested to update the GVWR on the VIN plate to 43,431 lb. to represent the total GAWR of the front and rear axles combined. Photos of both VIN tags are available in the Check in section.

The manufacturer represented that this model, K8M was formerly known as K9S in their product line.

BUS TESTING BACKGROUND

On August 1, 2016, FTA announced a final rule for bus testing for improving the process of ensuring the safety and reliability of new transit buses. The rule satisfies requirements in MAP-21 to establish minimum performance standards, a standardized scoring system, and a pass-fail threshold based on the score.

FTA's Bus Testing Program (often referred to as "Altoona Testing" due to the location of the main testing center) tests new transit bus models for:

- Maintainability
- Reliability
- Safety
- Performance (including Braking Performance)
- Structural Integrity (including Structural Durability)
- Fuel Economy (Energy Efficiency and Range, for electric buses)
- Noise
- Emissions

Bus models that fail to meet one or more minimum performance standards will "fail" their test and thus be ineligible for purchase with FTA funds until the failures are resolved and validated through further testing. FTA will use this authority to make sure defects are corrected before a bus model can be acquired with FTA funding.

In each application to FTA for the purchase or lease of any new bus model, or any bus model with a major change in configuration or components to be acquired or leased with funds obligated by the FTA, the recipient shall certify that it has received the appropriate full Bus Testing Report and any applicable partial testing report(s) before final acceptance of the first vehicle. In dealing with a bus manufacturer or dealer, the recipient shall be responsible for determining whether a vehicle to be acquired requires full testing or partial testing or has already satisfied the requirements of this part. A bus manufacturer or recipient may request guidance from FTA in making these determinations.

The purpose of the testing is intended set a "Pass/Fail" standard and grade the performance of the buses in order to provide performance information to the transit authorities that can be used in their purchase or lease decisions. The intent of this report is to provide the grantee a relative measure of the performance of a particular model of transit bus against a standard of performance. The passing of this test should ensure a vehicle has a high probability of meeting its service life in the category it was tested.

The data included in this test report and other applicable reports should be reviewed to choose the most suitable bus for a grantee's operation. A higher scoring bus is not necessarily the best bus for a given application. For example, a bus with a powerful engine may score well because of its performance and gradeability, but

another bus with a smaller and more fuel-efficient engine could be a better choice for applications in mostly flat areas. It is the responsibility of the grantee to ensure the proper test report or applicable partial report is in their possession and has been thoroughly reviewed.

The score sheet for the subject vehicle of this test report is provided below. **This bus passed the Altoona test, with an aggregate score of 88.0.**

BYD Coach & Bus, LLC Bus# 2020-04									
Test category		Standard	Base Pts.	Bonus Pts.	Range	Range	Test Data	Score	FAIL
1. Maintainability	Unscheduled maint.	< 125 hours	2	14	0	125	34.8	12.10	
2. Reliability	# Class 2 failures	< 2 Uncorrected	2	6	0	2	0	8.00	
	Hazards	No uncorrected Class 1	10	0	P	F	P	10.00	
	Stability	Lane change, 45 mph?	2.5	0	P	F	P	2.50	
3. Safety		< 158 feet at 45mph	0.5	2	80	158	134.61	1.10	
	Braking	Holds Lane, Split coeffient	2.5	0	P	F	P	2.50	
		Parking brake, 20% grade	2.5	0	P	F	P	2.50	
	Acceleration 0-30 mph	less than 30 sec	1.5	0	P	F	P	1.50	
4. Performance	Gradeability 2.5%	more than 40 mph	1.5	0	P	F	P	1.50	
	Gradeability 10%	more than 10 mph	2	0	P	F	P	2.00	
	Distortion	Exits are operational	1	0	P	F	P	1.00	
	Static Towing	No significant deformation	1	0	P	F	P	1.00	
5. Structural Integrity	Dynamic Towing	Towable with std. wrecker	1	0	P	F	P	1.00	
	Jacking	Liftable with std. jack	1	0	P	F	P	1.00	
	Hoisting	Stable on jacks	1	0	P	F	P	1.00	
	Durability-Structural	No uncorrected failures	13	0	P	F	P	13.00	
	Durability-Powertrain	No uncorrected failures	12	0	P	F	P	12.00	
	Liquid fuels	1-13mpg			1	13	NA	0.00	
6. Fuel Economy	CNG	10-50 scf/mi		6	10	50	NA	0.00	
	Hydrogen	15-98 cf/mi	1		15	98	NA	0.00	
	Electric	1-3 kWh/mi			1	3	2.038	3.89	
7. Noise	Int. Noise (0-35 mph)	less than 80 db	0.5	3	30	80	73.6	0.88	
	Ext. Noise (0-35 mph)	less than 83 db	0.5	3	50	83	60.8	2.52	
	CO_2	0-4000 g/mi		4	0	4000	0	5.00	
	CO	0-20 g/mi		0.4	0	20	0	0.40	
8. Emissions	Total hydrocarbon	0-3 g/mi	1	0.4	0	3	0	0.40	
	NMHC	0-3 g/mi		0.4	0	3	0	0.40	
	Nitrogen oxides	0-3 g/mi		0.4	0	2	0	0.40	
	Particulates	0-0.1 g/m		0.4	0	0.1	0	0.40	
Total			60	40				88.0	

Note: The use of the scoring system is not mandatory for procurement. It is only necessary that the bus being procured has received a passing score.

40-FT ALTOONA TEST

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration U.S. DOT
In accordance with CFR 49, Volume 7, Part 665

Manufacturer: BYD Motors, Inc.
Model: BYD ELECTRIC BUS

Submitted for Testing in Service-Life Category
12 Year /500,000 Miles

Report Number: LTI-BT-R1307

The Thomas D. Larson
Pennsylvania Transportation Institute
201 Transportation Research Building
The Pennsylvania State University
University Park, PA 16802
(814) 865-1891

Bus Testing and Research Center
2237 Old Route 220 North
Duncansville, PA 16635
(814) 695-3404

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration U.S. DOT
In accordance with CFR 49, Volume 7, Part 665

Manufacturer: BYD Motors, Inc.
Model: BYD Electric Bus

Submitted for Testing in Service-Life Category
12 Year / 500,000 Miles

Report Number: LTI-BT-R1307

A2LA ACCREDITED
Mechanical Testing Certificate 3172.01

Quality Authorization	Director, Bus Research and Testing Center Title	6/27/14 Date

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EXECUTIVE SUMMARY

BYD Motors, Inc. submitted a model BYD Electric Bus, electric-powered 36 seat (including the driver) 40-foot bus, for a 12 yr./500,000 mile STURAA test. The odometer reading at the time of delivery was 671 miles. Testing started on April 25, 2013, and was completed on May 22, 2014. The Check-In section of the report provides a description of the bus and specifies its major components.

The primary part of the test program is the Structural Durability Test, which also provides the information for the Maintainability and Reliability results. The Structural Durability Test was started on August 29, 2013 and was completed on May 13, 2014.

The interior of the bus is configured with seating for 36 passengers including the driver. Free floor space will accommodate 13 standing passengers resulting in a potential load of 49 persons. At 150 lbs. per person, this load results in a measured gross vehicle weight of 39,150 lbs. The first segment of the Structural Durability Test was performed with the bus loaded to a GVW of 39,150 lbs. The middle segment was performed at a seated load weight of 37,200 lbs. and the final segment was performed at a curb weight of 31,890 lbs. Durability driving resulted in unscheduled maintenance and failures that involved a variety of subsystems. A description of failures, and a complete and detailed listing of scheduled and unscheduled maintenance are provided in the Maintainability section of this report.

Effective January 1, 2010 the Federal Transit Administration determined that the total number of simulated passengers used for loading all test vehicles will be based on the full complement of seats and free-floor space available for standing passengers (150 lbs. per passenger). The passenger loading used for dynamic testing will not be reduced in order to comply with Gross Axle Weight Ratings (GAWR's) or the Gross Vehicle Weight Ratings (GVWR's) declared by the manufacturer. Cases where the loading exceeds the GAWR and/or the GVWR will be noted accordingly. During the testing program, all test vehicles transported or operated over public roadways will be loaded to comply with the GAWR and GVWR specified by the manufacturer.

Accessibility, in general, was adequate; components covered in Section 1.3 (Repair and/or Replacement of Selected Subsystems) along with all other components encountered during testing, were found to be readily accessible and no restrictions were noted.

The Reliability section compiles failures that occurred during Structural Durability Testing. Breakdowns are classified according to subsystems. The data in this section are arranged so that those subsystems with more frequent problems are apparent. The problems are also listed by class as defined in Section 2. The test bus encountered no Class 1 failures. Of the 49 reported failures, two were Class 2, 40 were Class 3 and seven were Class 4.

The Safety Test, (a double-lane change, obstacle avoidance test) was safely performed in both right-hand and left-hand directions up to a maximum test speed of 45 mph. The performance of the bus is illustrated by a speed vs. time plot. Acceleration and gradeability test data are provided in Section 4, Performance. The average time to obtain 50 mph was 47.03 seconds. The Stopping Distance phase of the Brake Test

was completed with the following results; for the Uniform High Friction Test average stopping distances were 27.80' at 20 mph, 65.41' at 30 mph, 110.87' at 40 mph and 131.92' at 45 mph. The average stopping distance for the Uniform Low Friction Test was 32.42'. There was no deviation from the test lane during the performance of the Stopping Distance phase. During the Stability phase of Brake Testing the test bus experienced no deviation from the test lane but did experience pull to the left during both approaches to the Split Friction Road surface. The Parking Brake phase was completed with the test bus maintaining the parked position for the full five minute period with no slip or roll observed in both the uphill and downhill positions.

The Shakedown Test produced a maximum final loaded deflection of 0.162 inches with a permanent set ranging between -0.004 to 0.004 inches under a distributed static load of 27,000 lbs. The Distortion Test was completed with all subsystems, doors and escape mechanisms operating properly. Water leakage was observed during the test at the right side #1 & 3 windows and left side #2 & 5 windows at the middle seals.

The Static Towing Test was to be performed using a target load (towing force) of 38,268 lbs. The target test load of 38,268 (1.2 x 31,890 lbs. CW) was not reach during the first pull (20° up). The welds on the adjoining structure that the tow pinion is attached to failed at approx. 31,100 lbs. Further Static Towing Testing was terminated. The Dynamic Towing Test was performed by means of a front-lift tow. The towing interface was accomplished using a hydraulic under-lift wrecker. The bus was towed without incident and no damage resulted from the test. The manufacturer does not recommend towing the bus from the rear; therefore, a rear test was not performed. The Jacking and Hoisting Tests were also performed without incident. The bus was found to be stable on the jack stands, and the minimum jacking clearance observed with a tire deflated was 2.9 inches.

The Energy Consumptions Test was run on simulated central business district, arterial, and commuter courses. The results are available in Section 6. Energy Consumption.

A series of Interior and Exterior Noise Tests was performed. These data are listed in Section 7.1 and 7.2 respectively.

60-FT ALTOONA TEST

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration U.S. DOT
In accordance with 49 CFR, Part 665

Manufacturer: BYD Coach & Bus, LLC
Model: K11M

Tested in Service-Life Category
12 Year / 500,000 Miles

January 2020

Report Number: LTI-BT-R1905

The Thomas D. Larson
Pennsylvania Transportation Institute
201 Transportation Research Building
The Pennsylvania State University
University Park, PA 16802
(814) 865-1891

Bus Testing and Research Center
2237 Plank Road
Duncansville, PA 16635
(814) 695-3404

PennState College of Engineering

LTI BUS RESEARCH AND TESTING CENTER

FEDERAL TRANSIT BUS TEST

Performed for the Federal Transit Administration, U.S. DOT
1200 New Jersey Avenue, SE
Washington, DC 20590

In accordance with 49 CFR Part, 665

Manufacturer: BYD Coach & Bus, LLC
Manufacturer's address: 1800 S. Figueroa Street
Los Angeles, CA 90015

Model: K11M

Tested in Service-Life Category
12 Year / 500,000 Miles

Report Number: LTI-BT-R1905

Quality Authorization | Director, Bus Research and Testing Center (Title) | 1/16/2020 (Date)

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EXECUTIVE SUMMARY

TEST HIGHLIGHTS

The information in this report pertains only to this specific bus, as received from the manufacturer for testing. Any modifications made by manufacturer during testing are recorded in this report.

The Check-In section of the report provides a description of the bus and specifies its major components. The following table gives the salient specifications.

Manufacturer	BYD Coach & Bus, LLC
Model	K11M
Chassis Make/Model	BYD / K11M
Chassis Modified	No
Length	60 foot 6.5 inches
Fuel	Battery-Electric
Service Life	12-Year / 500,000 mile test
Number of Seats (including driver)	46 or 40 and 2 wheelchairs
Manufacturer-Designated Standing Passenger Capacity	43
Gross Vehicle Weight used for testing	66,690
Gross Vehicle Weight Rating	67,450 (Specified by Manufacturer)
Mileage at Delivery	4,074
Test Start Date	March 1, 2019
Test Completion Date	October 22, 2019

The measured curb weight was 11,220 lb. for the front axle, 17,230 for the middle axle and 24,700 lb. for the rear axle. These combined weights provided a total measured curb weight of 53,150 lb. There are 46 seats or 40 seats and two wheelchair positions, including the driver and free floor space for 43 standing passengers bringing the potential total passenger capacity to 89. There is enough free floor space to accommodate 51 standing passengers however, a placard shows the maximum number of standing passengers as 43. Therefore, the gross load represents 46 seated passengers and 43 standing passengers, for a total of 89 passengers. Gross load is calculated as 150 lb. x 89 = 13,350 lb. At full declared capacity, the measured gross vehicle weight was 66,690 lb. There is a potential to overload this bus with the available floor space for standing passengers. Weight details are provided in the Check-In section of this report.

The charger that BYD Coach & Bus, LLC supplied with the bus experienced intermittent shutdown while operating at our facility. BYD stated that this was caused by a high supply voltage from our utility. When measured, the supply voltage for the 480 VAC supply was on the high end of the acceptable +/- 5% allowable range.

BUS TESTING BACKGROUND

On August 1, 2016, FTA announced a final rule for bus testing for improving the process of ensuring the safety and reliability of new transit buses. The rule satisfies

requirements in MAP-21 to establish minimum performance standards, a standardized scoring system, and a pass-fail threshold based on the score.

FTA's Bus Testing Program (often referred to as "Altoona Testing" due to the location of the main testing center) tests new transit bus models for:

- Maintainability
- Reliability
- Safety
- Performance (including Braking Performance)
- Structural Integrity (including Structural Durability)
- Fuel Economy (Energy Efficiency and Range, for electric buses)
- Noise
- Emissions

Bus models that fail to meet one or more minimum performance standards will "fail" their test and thus be ineligible for purchase with FTA funds until the failures are resolved and validated through further testing. FTA will use this authority to make sure defects are corrected before a bus model can be acquired with FTA funding.

In each application to FTA for the purchase or lease of any new bus model, or any bus model with a major change in configuration or components to be acquired or leased with funds obligated by the FTA, the recipient shall certify that it has received the appropriate full Bus Testing Report and any applicable partial testing report(s) before final acceptance of the first vehicle. In dealing with a bus manufacturer or dealer, the recipient shall be responsible for determining whether a vehicle to be acquired requires full testing or partial testing or has already satisfied the requirements of this part. A bus manufacturer or recipient may request guidance from FTA in making these determinations.

The purpose of the testing is intended set a "Pass/Fail" standard and grade the performance of the buses in order to provide performance information to the transit authorities that can be used in their purchase or lease decisions. The intent of this report is to provide the grantee a relative measure of the performance of a particular model of transit bus against a standard of performance. The passing of this test should ensure a vehicle has a high probability of meeting its service life in the category it was tested.

The data included in this test report and other applicable reports should be reviewed to choose the most suitable bus for a grantee's operation. A higher scoring bus is not necessarily the best bus for a given application. For example, a bus with a powerful engine may score well because of its performance and gradeability, but another bus with a smaller and more fuel-efficient engine could be a better choice for applications in mostly flat areas. It is the responsibility of the grantee to ensure the proper test report or applicable partial report is in their possession and has been thoroughly reviewed.

The score sheet for the subject vehicle of this test report is provided below. **This bus passed the Altoona test, with an aggregate score of 83.3.**

BYD Coach & Bus, LLC Bus# 1905									
Test category		Standard	Base Pts.	Bonus Pts.	Range	Range	Test Data	Score	FAIL
1. Maintainability	Unscheduled maint.	< 125 hours	2	14	0	125	40.5	11.46	
2. Reliability	# Class 2 failures	< 2 Uncorrected	2	6	0	2	0	8.00	
	Hazards	No uncorrected Class 1	10	0	P	F	P	10.00	
	Stability	Lane change, 45 mph?	2.5	0	P	F	P	2.50	
3. Safety		< 158 feet at 45mph	0.5	2	80	158	138.3	1.01	
	Braking	Holds Lane, Split coeffient	2.5	0	P	F	P	2.50	
		Parking brake, 20% grade	2.5	0	P	F	P	2.50	
	Acceleration 0-30 mph	less than 30 sec	1.5	0	P	F	P	1.50	
4. Performance	Gradeability 2.5%	more than 40 mph	1.5	0	P	F	P	1.50	
	Gradeability 10%	more than 10 mph	2	0	P	F	P	2.00	
	Distortion	Exits are operational	1	0	P	F	P	1.00	
	Static Towing	No significant deformation	1	0	P	F	P	1.00	
	Dynamic Towing	Towable with std. wrecker	1	0	P	F	P	1.00	
5. Structural	Jacking	Liftable with std. jack	1	0	P	F	P	1.00	
Integrity	Hoisting	Stable on jacks	1	0	P	F	P	1.00	
	Durability-Structural	No uncorrected failures	13	0	P	F	P	13.00	
	Durability-Powertrain	No uncorrected failures	12	0	P	F	P	12.00	
	Liquid fuels	1-13mpg			1	13	NA	0.00	
6. Fuel Economy	CNG	10-50 scf/mi	1	6	10	50	NA	0.00	
	Hydrogen	15-98 cf/mi			15	98	NA	0.00	
	Electric	1-3 kWh/mi			1	3	NA	0.00	
7. Noise	Int. Noise (0-35 mph)	less than 80 db	0.5	3	30	80	72.9	0.93	
	Ext. Noise (0-35 mph)	less than 83 db	0.5	3	50	83	61.7	2.44	
	CO_2	0-4000 g/mi		4	0	4000	0	5.00	
	CO	0-20 g/mi		0.4	0	20	0	0.40	
8. Emissions	Total hydrocarbon	0-3 g/mi	1	0.4	0	3	0	0.40	
	NMHC	0-3 g/mi		0.4	0	3	0	0.40	
	Nitrogen oxides	0-3 g/mi		0.4	0	2	0	0.40	
	Particulates	0-0.1 g/m		0.4	0	0.1	0	0.40	
Total			60	40				83.3	

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Note: The use of individual test scores for each separate test is not mandatory for procurement. It is only necessary that the bus being procured has received a passing aggregate score to qualify for federal funding.

BYD ANTI-CORROSION PLAN

BYD ANTI-CORROSION PLAN

BYD has designed its electric buses to provide durable, reliable, and safe transit service throughout the life of the vehicle. To offer assurances to our transit partners, BYD purposely engineered its vehicles to be fully protected against corrosion. We based our corrosion plan on the research completed by our team of experts along with key industry professionals, our suppliers on how to design and engineer a vehicle that can best combat the effects of galvanic corrosion.

Our research found that there are three basic prerequisites that must be met for galvanic corrosion to occur in the first place. All three conditions must be present, and if any is missing, corrosion will not occur.

1. **Dissimilar Metals:** Every metal has corrosion potential. The farther apart the two metals are on the anodic index, the higher the potential for galvanic corrosion.
2. **Metal-to-Metal contact:** Two different metals in direct contact will generally cause corrosion if precautions are not taken.
3. **Exposure to an electrolyte:** Though rain and road splash contain naturally occurring electrolytes, the most destructive ones are found in road deicers such as sodium chloride (salt), calcium chloride, and magnesium chloride. Magnesium chloride is especially problematic in this regard.

BYD has taken great care to ensure that corrosion does not occur on its vehicles, but it is essential that our transit partners complete routine maintenance checks. That's why we have made our standard Preventative Maintenance Inspection plan to include standard routine inspections. Our corrosion plan requires that our customers conduct inspections prior to the start of winter, and after winter weather concludes. If any indication of corrosion is present, the area of concern needs to be addressed immediately. BYD requires a written report of these findings so both parties can be assured that this essential routine maintenance is being performed. This way, if any corrosion does creep through our defenses, the issue can be resolved quickly rather than spiraling into a real problem.

PREVENTATING GALVANIC CORROSION

To prevent Galvanic Corrosions, BYD utilizes the following measures:

1. **We eliminate or insulate metal-to-metal contact.**

   BYD employs a variety of methods to eliminate or insulate metal-to-metal contact, such as using Eck2—a sacrificial liquid barrier product. BYD also uses solid barrier products as insulators, including polyethylene tape, synthetic fasteners, and nylon washers.

2. **We prevent electrolytes from coming into contact with metals.**

To provide a protective barrier between metals and electrolytes, BYD uses epoxy-rich primers that provide the required protection. Automotive paints formulated for fleet application are used as topcoats, and for clear coating where appropriate.

3. **We minimize traps for water and salt.**

BYD designs its buses to reduce the size and number of areas where electrolytes can collect and keep the substrate wet. Where possible, weep holes are incorporated to drain water. In the design of tubing, the tube is either sealed or it is well-drained. Care is taken when we caulk tubular members to the aluminum skin, for example: to allow water to escape, the members are caulked at the top, but the bottom seams are left open for proper drainage.

No rivets are used to attach the aluminum skin. The exterior skin is held in place with adhesive. To further assure the minimization of water traps, attachments to the skin such as exterior lights, mirrors, or hinges are thoroughly isolated. Each attachment point is reviewed to determine the best means of isolation.

VEHICLE MATERIALS

All our bus materials were selected to combat acidic chemical compositions and atmospheric humidity, which can be worse than water present on a surface. Humidity will draw electrolytes upward, so BYD protects all metal components—including those higher up on the vehicle—rather than focusing only on those near the ground.

Rain and road splash are still huge contributing factors for corrosion, and BYD has taken this into account: All tubes are either sealed or designed to allow draining of any water that has entered, and tubes are also coated with a cavity wax.

BYD also stays abreast of new materials that become available in the marketplace to combat electrolytic corrosion (galvanic corrosion).

ALUMINUM EXTRUSIONS

Throughout the body of each bus 6061T aluminum extrusions are used, and 5052 aluminum sheeting forms the body panels and access doors. Improved undercoating materials, applied both prior to and following assembly, provide a high level of corrosion-resistance to the finished vehicle. The chassis is constructed of three types of steel, with low-alloy high-strength steel used extensively.

BUS FRAME

The body frame is assembled of aluminum extrusions, forgings, and castings. Aluminum is inherently corrosion-resistant, as surfaces form an oxide film barrier within hours of being shaped. Aluminum body-framing parts are coated with epoxy primer after assembly and prior to exterior panel installation.

The coating is applied from the skirt bottom level up to the window line.

ROOF STRUCTURE

The roof structure is composed of aluminum extrusion and 2mm-thick sheets made of 5052 aluminum. The aluminum, which is inherently resistant to corrosion, is painted with exterior paint wherever it will be exposed to the elements. Non-exposed interior surfaces are covered by insulating material.

FRONT AND REAR CAPS

Front end and rear caps are molded fiberglass, painted to match the customer's design. Fiberglass, of course, does not corrode.

SIDE PANELS

Side panels are manufactured from 2mm-thick sheets of 5052 aluminum; this metal has high resistance to corrosion. The exteriors of the panels are treated with epoxy paint prior to being painted with PPG coatings according to the customer's design. The interior surface of the panel is also painted with epoxy to prevent corrosion.

PROTECTIVE COATING

BYD continues to expand the use of powder-coated components and conducts periodic design reviews to address areas that may hold moisture.

Improved undercoating materials, such as PPG Corashield P8071-RF, are available in sprayable form, allowing the coating to get into small spaces. This product was developed specifically for underbody areas and exposure to high-impact sand or gravel, or other abrasive materials; we use it extensively. Corashield easily passed the "Gravelometer" test (SAE J400) at -30 degrees F, showing no gravel or stone damage on the test panels. It has passed the 1,000-hour salt-spray cabinet test, showing no corrosion under the coating, with the coating itself remaining intact. The film also remained unaffected by immersion in acidic and caustic solutions. This PPG product furthermore passed the Heat Aging Test (ASTM C792) of 14 days' exposure at 158 degrees F. This undercoating is environmentally safe and meets the strictest of air-quality regulations.

STEEL CHASSIS

BYD uses three different types of steel in the construction of its chassis: two types of high-strength steel—WL610 and WYS700—and mild carbon steel (Q345). For the chassis BYD uses PPG paint and primers that are high-rated anti-corrosion products. LP 150 is a high-epoxy zinc-rich primer that is sprayed on the frame at a thickness of 80 to 100 microns. A high solid-epoxy top coating, LT140, is applied at a thickness of 180-200 microns.

A coat of epoxy primer/sealer is sprayed along the top and bottom channels, following assembly of the body sidewalls. The vertical body posts are also provided with a coat of epoxy primer, and then completely coated with epoxy a second time. The second coat is applied to all aluminum extrusion, from the window line down.

Great care is also taken in how the aluminum body is joined to the chassis.

Once the chassis is assembled, it is shot-peened. Shot-peening serves two purposes. It cleans the surface and increases fatigue life—by up to 1000%. A study conducted by the SAE Fatigue Design and Evaluation Committee showed what shot-peening can do for welds: whereas regular welds would fail after 250,000 cycles, welds that had been shot-peened would only fail after 2.5 million cycles, and those failures would occur outside of the weld area.

The chassis is assembled with care taken that the surfaces are pre-treated, degreased, and free of any dirt particles prior to priming. Extreme caution is taken not to introduce contaminants in the process. The order is: blast process, prime spray, primer baking, finish paint first coat, finish paint second coat, trim, wax infusion, and then wax spray.

All exposed surfaces, along with the interior surfaces of tubing or other enclosed members, are treated with a wax corrosion-resistant protection system. All metal components have an anti-corrosion coating applied to interior surfaces.

- The wax coating is mixed in accordance with the manufacturer recommendations.
- A wax injection machine applies the wax into the interior of the formed steel components; the thickness is 20-40 microns.
- All the wax-based coating is removed from the area surrounding the injection points.
- Where appropriate, rubber stoppers are used to seal these injection points.
- Components are painted with anti-rust, anti-corrosion paint.
- Epoxy primer is applied to the connecting surface.

- Sealant is applied around the joints.
- Special aluminum rivets are used, where called for; these are designed to mate dissimilar metals.
- Aluminum spacers are riveted to aluminum tubes with the aluminum rivets. Where dissimilar metal fasteners are used, they are coated with ECK—a zinc-rich coating.

Inspections are then undertaken. Should the inspections reveal that any coatings have been compromised, those coatings are completely reapplied.

All surfaces of the chassis and body structure that come into contact with each other, constituting an aluminum-on-steel join, are first coated with a thick layer of epoxy primer. The initial coat is applied and allowed to dry on both the chassis and the body posts. Next, a second coat is applied and used as a "wet on wet" application between the body and the chassis, ensuring proper coverage.

All chassis-body bolting holes are coated with ECK anti-corrosive spray before and after assembly.

After the structure is secured, a second exterior coat of epoxy primer is applied to the bottom exterior face and to side channels of the aluminum posts, thereby preventing any corrosion between the steel skirt panel mounting brackets and the aluminum posts.

To guard against any interaction between the aluminum posts and the steel brackets, the forward and aft channels in the vertical body posts are treated with epoxy before any brackets are added. The wheel wells are completely sealed with Sika-Flex sealant, to prevent water from entering the bus.

SKIRT PANELS

The skirt panels are manufactured from 2mm-thick aluminum. BYD primes and paints both sides of the skirt panels, which are attached to the body with stainless-steel hinges; the surface of the panel where it is attached to the hinge is coated with the PPG primer. A piece of 3M Tedlar weather-resistant isolating tape is sandwiched between the hinge and the panel and between the hinge and the body, for added protection. Teflon corrosion-barriers are used on all skirt panel hardware, and the panels are locked in place with 5/16-inch square key locks.

BYD takes care of all appropriate sealing, waxing, isolation if dissimilar metals, and reduction of any exposure to electrolytes, and our partner agencies conduct semiannual inspections as an additional protective measure. This way, all our buses are thoroughly protected from galvanic corrosion, and are ready to perform for many years to come.

DESCRIPTION OF EXPORTABLE POWER SUPPLY

QUALITY ASSURANCE PROGRAM

BYD

Quality Assurance Program Plan

This Quality Assurance Program Plan describes the policies and company-wide control of the Quality Management System of BYD. The Quality Management System described in this plan meet the requirements of ISO 9001:2015, as well as statutory and regulatory, and customer requirements.

Scope of Registration:

Design and Development, Production and Servicing of BYD All-Electric Buses for Municipal Transit Authorities, Publicly Funded Agencies and Private Organizations.

History:

BYD purchased this complex in May of 2013, 120,000 sq. ft., not far from launching the first bus was manufactured. BYD ultimate goal is to be the number one electric bus supplier in North America. In constant pursuit of dominance as the number one electric bus builder, the original complex was expanded to over 450,000 sq. ft. work space in September 2017. An approximate 100,000 sq. ft. warehouse was built in 2018 to allow for more storage and protection of accountable purchased materials.

Recognizing the need for the highest quality standards in the industry, BYD has established goals of continues transparency with all ISO 9001 standards. Presently BYD is ISO 9001:2015 certified with Perry Johnson Registrars Inc. Regardless of the certification, BYD will build each and every bus using the ISO standards established.

BYD's parent company, BYD Company Ltd., has a long history; Established in February 1995, it is a leading high-tech enterprise in China, specializing in the information technology industry, including rechargeable batteries, mobile phones, IT components and assembly, traditional and electric automobiles and new energy products with unique technologies, such as solar power stations, stored energy stations, LEDs, & electrical fork-lifts. BYD has branches and offices around the world, including the United States, Europe, Japan, Hong Kong and other regions.

BYD Company Ltd. is one of China's largest companies to have successfully expanded globally. Specializing in battery technologies, their green mission to "solve the whole problem" has made them industry pioneers and leaders in several high-tech sectors

including high-efficiency automobiles, electrified public transportation, environmentally-friendly energy storage, affordable solar power and information technology and original design manufacturing (ODM) services.

As the world's largest manufacturer of rechargeable batteries, their mission to create safer and more environmentally friendly battery technologies has led to the development of the BYD Iron-Phosphate (or “Fe") Battery. This fire-safe, completely recyclable and incredibly long-cycle technology has become the core of their clean energy platform that has expanded into automobiles, buses, trucks, utility vehicles and energy storage facilities. BYD and all of their shareholders, including the great American investor, Warren Buffett, see these environmentally and economically forward products as the way of the future.

BYD has made a strong entrance to the North, Central and South American markets with their battery electric buses, and lineup of automobiles. Their mission lies not just in sales growth, but also in sociological integration and local job creation as they have poured incredible investments into developing offices, dealerships and manufacturing facilities in the local communities they now call home.

GLOSSARY

For purposes of all quality management system documentation, the definitions given in ISO 9000:2015 are applicable. Where appropriate BYD has added some definitions based on their specific application to this quality management system (QMS).

Concession (Waiver): permission to use or release a product that does not conform to specified requirements.

Correction: action to eliminate nonconformity.

Corrective action: action to eliminate the root cause of nonconformity or other undesirable situation in order to prevent their recurrence.

Corrective Action Report (CAR): used to document customer complaints, internal audit findings and process nonconformities, and supplier performance issues. The form is used to initiate corrective or actions.

Customer: organization or person that receives a product.

Customer satisfaction: customer's perception of the degree to which the customer's requirements have been fulfilled.

Design and development: set of processes that transform requirements into specified characteristics and/or into the specification of a product, process or system.

Document: information and its supporting medium (Examples: Quality Manual, procedures, work instructions and blank forms), which may be in hard copy or electronic format.

Effectiveness: extent to which planned activities are realized and planned results achieved.

Foreign object: debris or any material that is not intended to be part of the final product.

First Party Audit: First-party audits are often called internal audits. This is when someone from the organization itself will audit a process or set of processes in the quality management system to ensure it meets the procedure that the company has specified.

Grade: Category or rank given to different requirements for an object having the same functional use.

Infrastructure: facilities, utilities, equipment and services needed for the operation of an organization.

Interested Party: Stakeholder, person or organization that can affect, be affected by, or perceive itself to be affected by a decision or activity.

Internal audit: (performed by the organization itself, or by a certified Consultant) systematic, independent and documented process for objective evidence of the effective operation of the quality management system.

Key Characteristics: the features of a material, process, or part whose variation has significant influence on product form, fit, function, performance, service life, or manufacturability.

Key Performance Indicator (KPI): a metric that measures the trend of a core process to help evaluate the stability and effectiveness of that process.

Mission: Organization's purpose for existing as expressed by top management.

MME: Monitoring and Measuring Equipment (also frequently referred to as "calibrated equipment").

Nonconformity: non-fulfillment of a requirement.

Nonconforming Product: those products that contain one or more departures from the associated drawing, specification, or contractual requirement.

Organization: BYD Coach and Bus LLC.

Preventive action: action to eliminate the cause of a potential nonconformity or other undesirable situation in order to prevent their occurrence.

Process: set of interrelated or interacting activities, that use inputs to deliver an intended result.

Product: result of a process (for the purposes of all quality management system documentation, the term "product" is also used to denote "service," as appropriate).

Quality management system: a collection of business processes focused on achieving quality policy and quality objectives to meet customer requirements, expressed as the organizational structure, policies, procedures, processes and resources needed to implement quality management.

Quality objective: something sought, or aimed for, related to quality.

Quality planning: part of quality management focused on setting quality objectives and specifying necessary operational processes and related resources to fulfill the quality objectives.

Quality policy: overall intentions and direction of an organization related to quality as formally expressed by top management.

Record: document stating results achieved or providing evidence of activities performed.

Regulatory Requirement: Obligatory requirement specified by an authority mandated by a legislative body.

Re-inspect: inspection required after completion of repair or rework activities.

Requirement: need or expectation that is stated, generally implied or obligatory.

Rework: the reprocessing of nonconforming material to make it conform completely to requirements.

Scrap: action to make a controlled disposal of a nonconforming product, to preclude its original unintended use.

Second Party Audit: A second party audit is carried out on a potential or current supplier by a purchasing organization. The purpose is to use the audit result as part of the purchasing decision, a factor to conform to clause ISO 9001:2015.

Standard(s): governmental, industry, national and international quality standards, including ISO 9001:2015 and ISO 9000:2015.

Statutory Requirement: Obligatory requirement specified by a legislative body.

Supplier: organization or person that provides a product or service to the organization.

Third Party Audit: Independence of the **audit** organization is a key component of a third-**party audit**. Third-**party audits** may result in certification, registration, recognition, an award, license approval, a citation, a fine, or a penalty issued by the third-**party** organization or an interested **party**.

Top Management: President, or the group of VPs, Directors and Managers who direct and control the organization at the highest level

Validation: confirmation, through functional testing and the provision of objective evidence that the requirements for a specific intended use or application are capable of being fulfilled.

Verification: confirmation, through the provision of objective evidence that specified requirements have been fulfilled.

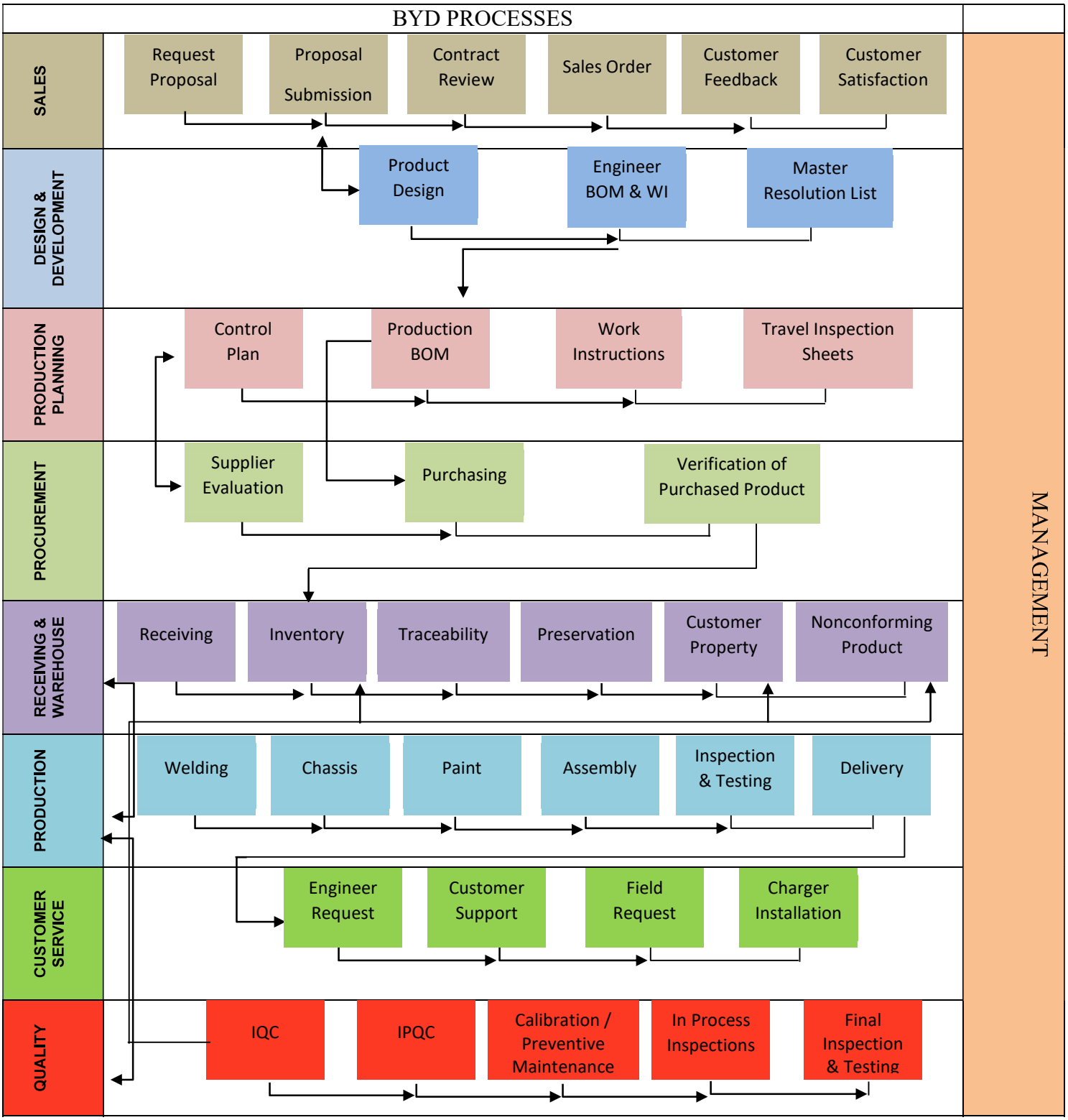
Vision: Organization aspiration of what an organization would like to become as

expressed by top management

Work environment: set of conditions under which work is performed.

ACRONYMS	DESCRIPTION
A	Assembly
APTA	American Public Transportation Association
BCN	Bill of Materials Change Notice
BOM	Bill of Materials
C	Chassis
ECN	Engineering Change Notice
ECO	Engineering Change Order
ECR	Engineering Change Request
ETA	Estimated Time of Arrival
FIFO	First In First Out
FMEA	Failure Mod Effects Analyses
FMVSS	Federal Motor Vehicle Safety Standards
FTA	Federal Transportation Administration
II	Inspection Instruction
IQC	Incoming Quality Control
IPQC	In Process Quality Control
KPI	Key Performance Indicators
MRB	Material Review Board
NDA	Non-Disclosure Agreement
NG	Not Given
OSHA	Occupational Safety & Health Administration
P	Paint
PC	Process Card
PE	Process Engineer
QC	Quality Control
QE	Quality Engineer
QM	Quality Manual
QMS	Quality Management System
QP	Quality Procedure
RFC	Request for Change
SOP	Standard Operating Procedures
SPO	Sales Production Order
SQE	Supplier Quality Engineer
TBD	To Be Determined
W	Welding
WI	Work Instruction
WIP	Work in Progress
WRT	With Regards To

INTERACTION OF PROCESSES



Warehouse Management Material Receiving

Warehouse is responsible for receiving materials and verifying information, such as Part Number, Material, Description, Quantity, Unit, Package, Order No, Supplier name, label, etc. If correct, they then put material in the Incoming Material Inspection area, if not correct, they separate it from the other material. They notify the Procurement Department of any inaccuracies.

Incoming Material Inspection- Quality Control (IQC)

Incoming Quality Control Personnel (IQC Personnel) perform material inspection by identifying incoming material and inspecting it using Inspection Instructions (II) or the applicable part drawings.

Inspection results are recorded on QF07-2 Incoming Material Inspection Record Form for single items. IQC personnel can also use QF07-1046 Material Receiving and Balance form to inspect multiple items, which is provided by Warehouse personnel. IQC records quantity accepted and quantity rejected and applies their (Green) Acceptance Stamp indicating inspection was completed for each item. Any rejected parts will be segregated and processed per QP-03 Non-Conforming Control Procedure and recorded on a QF07-2 Incoming Material Inspection Record form for each rejected item.

Parts are identified by part markings, stickers, packing lists, or any method needed to confirm the BYD part number.

Part drawings and specifications are kept electronically and are pulled up or printed and used to confirm parts meet requirements.

The first piece of each lot is 100% dimensionally checked.

Additional pieces are inspected based on an AQL sampling plan. Roof, Sidewall, Battery Box, Front Cap, and Rear Cap are inspected per the appropriate inspection record forms.

Discrepant material is identified and handled following the QP-03 Non-conforming Control Procedure.

In-Process & Final Inspection- Quality Control (IPQC)

Work Instructions (PC's/SOP's) are developed by Design and Process Engineering to provide the necessary instruction for Production workers to assemble the bus.
Inspection Record forms (QFs) shall synchronize with the Work Instructions such that inspection of work performed will be done as measurable production milestones are in progress and completed.

Workshops: Welding (W), Painting (P), Chassis (C), Assembly (A), and Test Line, are further divided into stations such as W1, W2, W3 . . . each station being responsible for assembly of portions of the bus. Test Line is divided into Lanes.

First Stage of Inspection takes place while the work is in progress by Production Personnel. This is referred to as "self-inspection" and includes the Production Worker, Lead, and Station Supervisor. This inspection occurs throughout the production process as the work is being performed and is the first opportunity to correct deficiencies in workmanship and provide an alert to deficiencies that may have resulted from short comings in in-coming material, design, etc. The station Leads and Supervisors are responsible for the entirety of "self-inspection". Production signs-off on the applicable Inspection Forms. The Quality Engineer and Supplier Quality Engineer can inspect the quality of workmanship and quality of material at this stage.

The Second Stage of inspection occurs randomly during the production process and as a formality at the conclusion of each station, performed by QC Inspector within the QC Department. QC signs-off/stamps the applicable Inspection Form. Non-conformities of this inspection are noted on the QF07-456 Punch List form and begin the document within the "Traveler". The goal is to rework the Punch List items of workmanship deficiency prior to proceeding to the next station and completing ECN's of process or design correction as early in the process as possible. The bus can be allowed to move forward to the next station if necessary by issuing QF07-698 Station Move Notice for Assembly, QF07-699 for Chassis, QF07-700 for Welding, and QF07-701 for Paint, and meeting the requirements of the form by acquiring required signatures. The Quality Engineer and Supplier Quality Engineer can inspect the quality of workmanship and quality of material at this stage.

The Third Stage of inspection is the same as the Second Stage, however, rather than at the conclusion of the stations, it is at the conclusion of the major stations (W, P, C and A). The bus can be allowed to move forward to the next station, if necessary, by issuing QF07-698 Station Move Notice for Assembly, QF07-699 for Chassis, QF07-700 for Welding, and QF07-701 for Paint, and meeting the requirements of the form by acquiring required signatures. The Quality Engineer and Supplier Quality Engineer can inspect the quality of workmanship and quality of material at this stage.

The Fourth and Final Inspection occurs after all production and associated Punch Lists have been corrected. This Final Inspection most often results in a Punch List and a follow-up re-inspection after Production completes the necessary rework. The Quality Engineer and Supplier Quality Engineer can inspect the quality of workmanship and quality of material at this stage. A final inspection is done in Testline using the Records Checklist Before Delivery (QF07-363-6) form as well as the Final Delivery Checklist (QF07-620). Finally, the last step is for the Vehicle Final Acceptance Form (QF07-586) to be filled out and signed by necessary entities. This form indicates an acceptance of the completion of the production of the bus and/or indicates any open items that are being accepted by the customer to do post-delivery. All post-delivery work will be coordinated by BYD Customer Service team and accepted by the customer. Record Retention is controlled per QF04-6 Master List of Records for storage location, retrieval, indexing, retention minimum, and disposal.

Inspection Records

Forms pertinent to the inspection processes include SOP's and PC's, Inspection Record forms (QFs for Welding, Paint, Chassis, Assembly Departments and System Validation), Incoming Material Inspection record, In Process Inspection Record Form, Rework Notification Form, Sub-Assembly Forms (Left Sidewall, Right Sidewall, Chassis, Roof, Front and Rear Assembly), and Engineering Change Notice.

Distribution and Control: SOP's and PC's, Inspection Record forms (QFs for Welding, Paint, Chassis, and Assembly Departments), and Sub-Assembly Forms (Left Sidewall, Right Sidewall, Chassis, Roof, Front and Rear Assembly), are created by Process Engineering and Quality Engineering. Inspection Record forms may be printed by trained QC personnel for each workstation, per bus, as required, and are controlled and maintained by Document Control. The Inspection Record forms used during manufacturing are maintained on the bus and results of the inspection process are documented during the build process creating inspection records from the blank forms. For details of inspection tasks to perform, refer to the applicable Inspection Record form QF07-XXX, related to the Bus Project and Workstation.

Production performs work according to work instruction and records approval of work by signing self-inspection on inspection record.

QC Inspector verifies and accepts work with green acceptance stamp in the QC Inspection column on the inspection form. QC Inspector rejections are stamped with a red stamp to distinguish between rejections and acceptance. The QC stamps are issued and maintained using QF07-426 Quality Department Stamp Log for traceability.

QC Inspector documents any rejects on the QF07-456 Punch List and posts a copy on the Bus. External customer Inspector rejects are added to a Customer Punch List through communication with the QC inspector and transferred over to the QF07-426 Punch List by QC Inspectors.

Punch List rework is confirmed by Production signing self-inspection, QC inspector signing QC inspection. External Customer Inspectors (if they so choose) sign the Customer Inspection Punch list they added.

Rework that is more than a standard rework and in need of documented rework instructions will require disposition on form QF07-43 In-Process and Final Inspection Record as Rework per Process Engineer Rework Instructions. Process Engineer must create instructions using QF07-64 Rework Notification.

At the end of each substation (example, end of W1) the production lead and QC inspector confirm the bus is ready to move to the next station with a review of the inspection record, ECN/Rework Trackers, Punch List and any other necessary documentation. The production lead checks inspection record self-inspection and Punch List self-inspection are acceptable and signed off. The QC inspector checks inspection record QC Inspection and Punch List QC Inspection items are acceptable and signed off. If all items are not complete the bus may move to the next station by issuing QF07-698 Station Move Notice for Assembly, QF07-699 for Chassis, QF07-700 for Welding, and QF07-701 for Paint, and meeting the requirements of the form by acquiring all applicable signatures.

At the end of each major station (example end of W) the production supervisor and QC inspection lead must confirm the Bus is ready to move to the next major station. The production supervisor and QC inspection lead must check all substation records and the bus. If all items are not complete, the bus may be allowed to move forward to the next station if necessary by issuing QF07-698 Station Move Notice for Assembly, QF07-699 for Chassis, QF07-700 for Welding, and QF07-701 for Paint, and meeting the requirements of the form. The Quality Engineer and Supplier Quality Engineer can inspect the quality of workmanship and quality of material at this stage.

After completion of the Bus, the original copies of all records are forwarded to the QC Data Clerk to review all bus records for completeness and accuracy by using QF07-363 Records Checklist Before Delivery. All records are then forwarded and maintained in Document Control according to QF04-6 Master List of Records.

Concurrent with the delivery of a bus, copy of forms (records) may be transferred to the Customer if required, include the following:

Incoming Inspection QF07-xxx Inspection Record forms:

Chassis

Front frame
Left sidewall frame
Right sidewall frame
Rear compartment frame
Roof frame
Roof battery frame
Left side battery frame
Right side battery frame

Welding and frame Assembly QF07-xxx Inspection Record forms:

Station W1
Station W2
Station W3
Station W4
Station W5
Station W6
Station W7
Station W8
Station W9
Station W10
Station W11

Paint and Undercoating QF07-xxx Inspection Record forms:

Station P1
Station P2
Station P3

Chassis QF07-xxx Inspection Record forms:

Station C1
Station C2
Station C3
Station C4
Station C5
Station C6
Station C7
Station C8
Station C9
Station C10

Final Assembly QF07-xxx Inspection Record forms:

Station A1
Station A2
Station A3
Station A4
Station A5
Station A6
Station A7
Station A8
Station A9
Station A10
Station A11
Station A12

Test Line QF07-xxx Inspection Record forms:

Speed test
Axle Load and Brake Test
Alignment (As requested by Customer)
Bus Trace Card
Water test
Charging and Road test
Final Appearance Inspection
Headlight Adjustment
Air System Failure
Battery Cycle Test

Non-conforming product's identification and isolation

IQC should inspect any incoming material and confirm that material is qualified according to inspection instructions and/or drawings. Non-conforming incoming material should be recorded on QF07-2 Incoming Material Inspection Record Form. A Red Tag should be affixed to any unqualified parts, and the parts should be placed in an area designated for non-conforming parts. The area should be clearly marked that only non-conforming parts are held in that location, and kept neatly isolated from areas containing unevaluated or conforming parts.

Evaluation and reporting of non-conforming product(s)

Material(s) evaluated to be non-conforming by IQC can be directly returned to the supplier by the procurement department. However, if the production needs such material(s) urgently, the factory can evaluate the non-conforming material and decide how to best deal with it considering the real situation.

IQC inspectors are responsible for filling in the QF07-2 Incoming Material Inspection Record Form and then reporting the results of the inspection to the IQC supervisor.

The quality department should coordinate with process engineering, production, purchasing and design engineering departments to evaluate non-conforming material and come up with a decision as to what to do with it when receiving any non-conforming report. If the evaluation team can't come to an agreement, the plant manager should make a decision. If non-conforming material will, could, or might affect customer satisfaction, this non-conformance should be reported to the customer before any decision is made or action is taken.

Potential outcomes of incoming non-conforming product evaluations include Sorting, Use As Is, Rework, Return, Scrap, Order for QTY shorted. The chosen outcome must be documented on MRB Disposition of QF07-2 Incoming Material Inspection Record Form.

Treatment of non-conforming material

The inspector has the right to refuse acceptance of the material directly at the time of delivery when incoming material is a one-piece item, and critically non-conforming. The warehouse shall not put this kind of material in stock; the material control and procurement department should contact the vendor to deal with returning material.

If the incoming material is in a big batch and inspection result is unqualified, the unqualified batch must be handled according to the following requirement:

When production needs it urgently, and the non-conforming character of products can be easily identified, evaluation opinion can be sorting.

IQC is responsible for sorting by separating conforming and non-conforming product. IQC will attach the Green Acceptable label to conforming product, and the Red label to non-conforming product.

Warehouse should put selected qualified material in stock.

If a product's (component's or material's) non-conforming character does not affect the plant's final product assembly, functional performance, service life, safety and environmental protection regulations or mandatory product certification testing, the results of the evaluation can be "use as is." In such event:

The IQC inspector tears off the Red Tag label, and paste Green Tag label and notify warehouse to put them in stock.

The "use as is" acceptance is only valid for receiving that particular batch of unqualified parts; it does not affect the standards for future use of parts.

If the non-conforming product could impact customer satisfaction, the results of the non-conforming evaluation and any related or additional analysis must be submitted to the customer. "Use as is" can only be carried out if the customer approves this use. "Use as is" items must pass final inspection and test(s). If the item cannot meet delivery inspection standards or customer requirements, the bus cannot be delivered without first receiving the customer's approval.

When non-conforming material(s) may affect product assembly, functional performance, service life, safety and environmental protection regulations or mandatory product certification testing, or there is no test method that may be used to determine whether such might be the case, the classification of non-conforming material(s) must be "rejection".

The inspector must paste a Red Tag label on the material(s) and place them in the "rejection" area, for Material Review Board Disposition.

Non-conforming self-made parts/product identification and isolation

When non-conforming parts are found during operator self-checking, IPQC first inspection, routing inspection, or finished product inspection, the non-conformance is documented on the inspection record and the part is identified according to section 5.2.2. Small component can be placed in bins, separating the item for acceptable material.

MRB Process-evaluation and disposition of non-conforming material and product.

Quality Engineer (QE) should confirm causes of non-conformances. If necessary, QE should invite production, warehouse, material control, quality control, and/or process engineering to meet and evaluate the situation.

If non-conformity is determined to directly result from an abnormal process and the responsible party/department and remedy can be quickly and clearly identified, Quality Engineering can detail the recommended remedy directly on the inspection record sheet.

If non-conformity is determined to be caused by an abnormal process, but the responsible party/department and/or remedy can't be quickly and clearly identified, QC should complete an QF07-43 In-Process Inspection Record Form and review the non-conforming product(s) with QE. QE should organize a meeting of the process, production and material control departments to determine the responsible department. The process department should organize all relevant departments to analyze the issue and identify both the causes of non-conforming and corrective actions. The quality department needs to track the corrective action and confirm that it has been taken and the situation resolved.

MRB Process - processing of non-conformance material or products AFTER MRB evaluation and disposition.

The outcome of a non-conforming product evaluation can be: rework/repair, use as is, sorting or scrap. The outcome is determined and the appropriate box is checked on the QF07-43 In Process Inspection Record Form in the MRB disposition section.

If non-conformance is individual or slight, or can be fixed by rework/repair, the evaluation result could be rework/repair.

If the evaluation outcome is “rework/repair”, the production department should rework/repair non-conforming parts according to “Rework/Repair Instructions.” If necessary, process engineer(s) should instruct how to rework/repair on-site. When the production department finishes the rework or repair, production should inform IPQC to re-inspect. If the result is “good,” IPQC should record acceptance on inspection record or attach a Green Tag if it is a part. If the result is not acceptable, re-evaluation can be conducted. The result of re-evaluation can be “release for use as is,” or “scrap”.

If the non-conforming material(s) does not affect the service life, product assembly, function, performance, safety, cosmetic appearance, environmental or mandatory product certification, the result of the evaluation can be that the materials are “release for use as is.”

IPQC should notify production that this clearance to “release for use as is” is only for this inspection batch, and does not affect the evaluation standard(s) for future inspection.

When production department needs the material urgently and non-conforming character is easy to identify, evaluation result can be: sorting.

IPQC or production should do 100% inspection sorting for conforming and non-conforming parts. QE and process engineers should decide if non-conforming parts can be repaired or reworked.

If the non-conforming material will affect service life, product assembly, function, performance, safety, cosmetic appearance, environment or mandatory product certification, the result of the review can be “scrap.”

Non-conformance rejection treatment

The production department should isolate rejected self-made non-conforming parts and inform IPQC. Smaller parts shall be put in a bin. IPQC shall organize relevant departments to evaluate it. Evaluation result can be: rework/repair or scrap.

Non-conformances labeling, report

When a non-conformance is found by operators or IPQC, the non-conformance should be labeled by color tape or Red Tag, QE should be informed with this. At the same time, IPQC should document the non-conforming material / part on QF07-43 In-Process Inspection Record Form and on the QF07-456 Punchlist.

Non-conformance confirming, temporary treatment and evaluation

QC supervisor should confirm cause of non-conformance on-site when receiving non-conformance report and determine treatment for non-conformance. QC supervisor shall organize production department and process department to evaluate it together as needed.

If non-conformance is caused by vendor and can't be reworked or repaired, deal with it according to 5.1.2; if non-conformance happens on self-made parts, production department should isolate it and decide if it can be reworked or repaired.

If the non-conformance is caused by abnormal operation and is minor, the production employee can fix it directly by rework or repair, ask IPQC to re-inspect, and mark it on QF07-43 In-Process Inspection Record Form.

If the non-conformance is caused by abnormal operation and can't be fixed in short time, QC should fill in the QF07-43 In Process Inspection Record Form and submit it to process department, production department, determine responsible department and actions.

The treatment after non-conformances evaluation

Non-conforming product evaluation results could be: "release for use as is", "rework/repair", etc.

If non-conformance will not affect customer satisfaction and following production actions greatly, evaluation result can be cleared for "use as is". For a finished vehicle use as is release needs to be approved by the quality department, production, and process departments. IPQC should record such finding on the QF07-620 Final Delivery Checklist. If non-conforming items will affect product safety performance or laws, a "release for use as is" determination is not allowed.

If non-conformances could negatively affect customer satisfaction and future production, but can be fixed by repair/rework, the evaluation result can be "rework/repair". IPQC should record this determination on the QF07-43 In Process Inspection Record Form with an "X" mark. After production finishes rework/repair, IPQC must re-inspect the item(s) and record the new result on the QF07-43 In Process Inspection Record Form. If

non-conformance may negatively impact product safety performance or compulsory certification, or is to or related to a critical part, a compromise release is not allowed.

If a vehicle has already been sent for delivery before a non-conformance has been discovered, the Project Management department must notify the customer immediately to determine what course of action to take, and then follow up to ensure that this action has been completed.

Stock vehicle

For a vehicle which has been in stock for more than 2 months, deal with it as “Stock vehicle.” Before delivering this kind of vehicle, the warehouse should inform test line inspectors to re-inspect the finished vehicle, and record the inspection result on the QF07-620 Final Delivery Checklist. If the vehicle passes inspection, then it may be delivered.

Suspected products

Any suspected product in the operations area should be labeled and stored in the isolated, non-conforming product area. The owner of this area should arrange an on-site inspection with IPQC. If the result is OK, the product should be treated as a normal product; if the result is non-conforming, then the item should have a IPQC Red Tag affixed to it and be segregated from good product.

Inactive material

The quality department should consult with the process and financial departments to review the inactive material and decide how to address it.

Non-conforming analysis and improvement

In order to prevent the recurrence of non-conforming product(s), the department that discovers the non-conforming product(s) and the quality department shall consult with the process, production, and other departments as necessary, to analyze causes and develop corrective actions, and then prepare a report on how to follow up on this non-conformance and confirm that action has been taken and the situation resolved.

Quality department should regularly collect and analyse non-conforming data (such as the common rework / repair issues, frequency of changing parts, etc.) to seek opportunities for continuous improvement.

Customer Support of Customer Request

Once the bus has been delivered to the customer, if there are 1) ECN items that could not be completed prior to delivery and/or 2) additional punch list items identified and requested to be repaired or changed by the customer, Customer Service is responsible

to coordinate the return of the bus, if necessary, and issue a Work Order to complete the work if work is to be completed in the field or communicate with the Planning department to return the bus to the facility to do work. Planning will initiate a repair/maintenance form which will trigger a Work Order for accounting and a Job Card for Quality and Production.

Demonstration, Trade Show Support and Customer Delivery

Trade shows and customer demonstrations are required to promote BYD's products. Sales is responsible to develop a workable schedule.

Customer Service is responsible to:

- Coordinate the transportation of buses to and from the destination.
- Make available a driver for customer demonstrations.

Customer deliveries are required after production is complete and Quality has released the bus.

Field Requests

Buses used for customer demonstrations and/or trade shows that require repair are the responsibility of Customer Service if work is to be done in the field.

Technicians request parts from the factory for repairs that can be accomplished in the field.

If Bus needs to come back to the production plant, Project Management is responsible for:

- Dissemination of the information to Production and Quality team members.
- Obtaining an acceptable schedule from Production and Quality to complete the work and return the bus in a timely manner.
- Following the progress of the work.
- Ensure the bus is in good working condition. Repairs are coordinated with Production and Quality.

Charger Installation and Repair

Chargers are provided with each bus. Project Managers are responsible for coordinating the purchase activity with the Energy Division to produce the units.

Project Managers are responsible for coordinating the delivery and install of the units with the customer and Customer Service department.

Customer Service department supports the delivery of interface/chargers but not responsible for installation. If interface/chargers have issues Customer Service responds by supporting to fix the issue or make repairs.

Quality Management System (QMS)

BYD, is committed to defining our position in the transportation industry and understanding how relevant factors arising from legal, political, economic, social and technological issues influence our strategic direction and our organizational context.

BYD, analyses, monitors and reviews factors that may affect our ability to satisfy our customers and external parties, as well as; factors that may adversely affect the stability of our process, or our management system's integrity.

To ensure that our QMS is aligned with our strategy, while taking account of relevant internal and external factors; we initially collate and analyze pertinent information in order to determine potential impact on our context and subsequent business strategy.

BYD, then monitors and reviews this information to ensure that a continual understanding of each group's requirements is derived and maintained. To facilitate the understanding of our context, we regularly consider issues that influence our context during management review meetings and are conveyed via minutes and business planning documents. The following are both Internal and External issues that BYD considers when planning and evaluating the need for improvements within our QMS:

Internal Issues	External Issues
Market Share	Customer & Suppliers
Employees	Markets & Competition
Performance	Regulatory & Statutory
Capacity	Economic Back Drop
Values & Culture	Technological
Innovation & Knowledge	Cultural and Social

The output from this activity is evident as an input to the consideration of risks and opportunities, and the actions that we take to address them.

Although we acknowledge that ISO 9001:2015 does not require our organizational context to be maintained as documented information, we maintain and retain; in addition to this document, the following documented information to describe our organizational context:

- Analysis of business plans, strategies, and statutory and regulatory commitments;

- Analysis of technology and competitors;
- Economic reports from relevant business sectors;
- Technical reports from technical experts and consultants;
- Minutes of meetings, process maps and reports, etc.

Relevant Interested Parties

BYD, recognizes that we have a unique set of interested parties whose needs and expectations change and develop over time, and furthermore; that only a limited set of their respective needs and expectations are applicable to our operations or to our quality management system. Such needs and expectations broadly include those shown in the table below.

Interested Parties	Needs & Expectations
Owners	Profitability & Growth
Customers	Price, Reliability & Value
Employees	Shared Values & Security
Suppliers	Beneficial Relationships
Regulatory & Statutory	Compliance & Reporting

To ensure that our products and processes continue to meet all relevant requirements, we identify and assess the potential impact of any relevant needs and expectations that may be elicited from the interested parties.

Where appropriate, to ensure that our processes are aligned to deliver the requirements of our interested parties; we convert relevant needs and expectations into requirements which become inputs to our QMS and to our product and service designs.

Based on the analysis of the issues and requirements, BYD. has established the scope of our quality management system in order to implement our objectives and our policies that are relevant to our context, products and any interested parties.

This document describes our quality management system, delineates authorities, inter-relationships and responsibilities of process owners and personnel that operate within the system. Although we recognize that ISO 9001:2015 does not require a quality manual, we have decided to produce and update our quality manual, as our employees, customers, suppliers and other external parties perceive it will add value to our operations.

This document also demonstrates the relationship between our quality management system and the sequence and interaction of our key processes. Conformance to ISO 9001:2015 has been verified utilizing a formal assessment and review process by Perry Johnson Registrars, Inc.

Management System Processes

BYD. has implemented a quality management system that exists as part of a larger strategy that has established, documented and implemented our processes, quality policies and objectives, while satisfying the requirements of ISO 9001:2015. To achieve this, BYD has adopted the process approach advocated by ISO 9001:2015. Top management has determined the processes required for achieving the intended outputs. By defining nine key process-groups and by managing their inputs, activities, controls, outputs and interfaces; we ensure that system effectiveness is established and maintained. These key process groups include;

- Sales
- Design and development
- Production Planning
- Procurement
- Production
- Receiving and Warehouse
- Customer Service
- Quality
- Management

These process groups are described using tools such as documented procedures, process maps, flow diagrams, matrices, schedules, and charts, etc.

It is recognized that defining, implementing and documenting our quality management system is only the first step towards fully implementing its requirements. The effectiveness of each process and its subsequent output is measured and evaluated through regular internal audits, quality inspections and data analysis.

We use key performance indicators (KPIs) that are linked to our objectives to control and monitor our processes, as well as assessments to determine the risks and opportunities inherent to each process. We use trends and indicators relating to nonconformities, objectives and corrective action, as well as, monitoring and measurement results, audit results and customer satisfaction data, process performance and the conformity of our products.

Outsourced Processes

Where BYD. identifies the requirement to outsource any process, or part thereof, which affects conformity with the stated requirements; BYD identifies control criteria such as; the competence of personnel, inspection regimes, the provision of product conformity certificates, adherence to specifications and specific job files, etc.

The controls identified do not absolve us of the responsibility to conform to client, statutory and regulatory requirements but instead they enhance our capacity to effectively manage our supply chain. The controls adopted are influenced by the potential impact of outsourcing on meeting customer or external party's requirements and the degree to which control of the process is shared. Outsourced processes are controlled via purchasing and contractual agreements. They may also be assessed by 2nd party audits and performance data reviews where appropriate.

Documented Information

BYD, ensures that our QMS includes the documented information that is required to be maintained and retained by ISO 9001:2015, and additionally, any documented information identified by our organization that demonstrates the effective operation of our QMS. BYD. applies the following criteria to all types of documented information in order to assess whether the information is necessary for demonstrating the effectiveness of our QMS, and whether it should be formally controlled.

- Communicates a message internally or externally;
- Provides evidence of process and product conformity;
- Provides evidence that planned outputs were achieved;
- Provides knowledge sharing

Should any of the above criteria apply, BYD, ensures that this information is retained and/or maintained as a form of documented information.

Creating & Updating

BYD. ensures that when we create documented information it is appropriately identified and described (e.g. title, date, author, reference number) and is available in an appropriate format (e.g. language, software version, graphics, etc.) and on appropriate media (e.g. paper, electronic). All documented information is reviewed and approved for suitability and adequacy.

Controlling Documented Information

Documented information is retained to provide evidence of conformity to the requirements specified by ISO standards, customer requirements and of the effective operation of our management system. BYD, uses standard forms and templates that are accessed via a local area network computer system. An electronic document management system, which is backed up and updated as required, is used to retain documented information ensuring only the current versions are available to users. All management system documents are controlled according to the Control of Documents Procedure (QP-01) which defines the process for:

- Approving documents for adequacy prior to issue;

- Reviewing and revising as necessary and re-approving documents;
- Ensuring that changes and current revision status of documents are identified;
- Ensuring that relevant versions of applicable documents are available at points of use;
- Ensuring that documents remain legible and readily identifiable;
- Ensuring that documents of external origin are identified and their distribution controlled;
- Preventing the unintended use of obsolete documents;
- Ensuring that documents of external origin are identified and their distribution controlled.

Leadership and Commitment

BYD leadership is also responsible for implementing the QMS, which includes the development and deployment of the quality policy, the quality objectives, and product/project-specific plans that are customer focused.

Top management provides the leadership and governance to all activities related to the lifecycle processes including defining the strategic direction, responsibility, authority, and communication to assure safe and effective performance.

BYD management structure provides necessary support for creating and establishing appropriate processes that are important for maintaining and achieving our quality objectives and policies.

In addition, management activities include systematic verification of the effectiveness of our QMS by undertaking internal audits and analyzing performance data.

Regular management reviews ensure that our quality management system is adequate and effective, and that any necessary adjustments are made as a result.

Top management is committed to implementing and developing the quality management system and this commitment is defined by our corporate policies and objectives. BYD ensures that our policies are understood, implemented and maintained throughout all levels of the organization through printed distribution of our policy statements and through periodic management review of the policy statements and corporate level improvement objectives. BYD communicates our mission, vision, strategy, policies and processes to all employees in order to:

- Create and sustain shared values of fairness and ethical behavior;
- Establish a culture of trust and integrity;
- Encourage commitment to quality;
- Provide people with the required resources, training and authority to act with accountability;

- Inspire, encourage and recognize people's contribution.

In addition, our policies, objectives and targets are communicated and deployed throughout the business via individual performance objectives which are established and discussed during employee performance reviews.

Customer Focus

BYD strives to identify current and future customer needs, to meet their requirements and to exceed their expectations. Top management ensures that the focus on improving customer satisfaction is maintained by setting and reviewing objectives related to customer satisfaction at management review meetings.

Top management also ensures that customer requirements are understood and met. Customer requirements are understood, converted into internal requirements and communicated to appropriate personnel within the management structure. Customer complaints and other customer feedback are continually monitored and measured to identify opportunities for improvement. We continually look for ways to interact directly with our customers to ensure that we focus on their unique needs and expectations.

Quality Policy

The quality policy acts as a compass by providing the direction and framework for establishing key corporate level performance measures, as well as related objectives and targets. Top management ensures that our corporate policies are established and documented, and that the policies are available to all interested parties.

The Quality Manager has overall responsibility for defining, documenting, implementing and reviewing our quality policy in consultation with the management teams and other personnel, or their representatives. The policy is reviewed at least annually, as part of the management review program or at a frequency determined by:

- The changing needs and expectations of relevant interested parties,
- The risks and opportunities that are presented through the risk management process

The quality policy is communicated to all employees at all levels throughout our organization via training, regular internal communications and reinforcement during employee performance reviews. Employee understanding of our policies and objectives is determined during internal audits and other methods deemed appropriate.

Quality Policy Statement

BYD is committed to delivering the industries safest and highest quality vehicles, while also achieving our applicable customer, statutory, and regulatory requirements! With the support of each and every BYD employee we will work to continually improve our Quality Management System.

People

BYD is committed to equality in employment opportunity and rewards, embracing wholeheartedly the cultural diversity within the communities we call home. Our employees' welfare and interests are foremost throughout all aspects of our business and how we conduct our affairs. BYD is committed to:

- Creating and nurturing an environment of success based on honesty and integrity;
- Equitable sharing in the success of the company;
- Empowerment through training and communication;
- Individual growth and equal opportunity;
- Designing and providing a safe and secure work environment.

Customers

Customer needs are paramount and represent the highest priority within our business. Our obligation is to proactively seek out and define customer needs while addressing all requests expeditiously without creating false expectations.

Community

BYD is committed to supporting the communities within which we operate. We believe in the practice of social responsibility and encourage similar behavior in our employees and suppliers. We support the conservation of the physical environment and the prevention of pollution at our facilities. We proactively comply with all applicable safety, environmental, legal and regulatory requirements to which we subscribe.

Quality

Beginning with a clear definition of customers' expectations, we strive to consistently meet or exceed them. We adhere to all applicable standards and customer specific requirements and endeavor to provide processes that ensure we achieve this in order to build a robust and world class business.

Roles, Responsibilities and Authorities

Members of Top management are ultimately responsible for the quality of BYD products and services since they control the resources, systems and processes by which conforming work is accomplished. Top management are responsible for business planning, development and the communication of our policies, quality management system planning, the establishment and deployment of objectives, the provision of resources needed to implement and improve the quality management system and for undertaking management reviews. Top management has assigned the responsibility and authority to the management teams and departments to:

- Ensure that QMS processes are delivering their intended outcomes;
- Report on the operation of the QMS and identifying any opportunities;
- Ensure that improvement is taking place;
- Ensure that customer focus is promoted throughout the organization;
- Ensure that whenever changes to the QMS are planned and implemented; the integrity of the system is maintained during changes;
- Ensure that responsibilities and authorities relating to the QMS are communicated and understood.

All managers demonstrate their commitment to the development and improvement of the quality management system through the provision of necessary resources, through their involvement in the internal audit process and through their proactive involvement in continual improvement activities. Emphasis is placed on improving both the effectiveness and efficiency of key system processes.

All managers are responsible for execution of the business plan and the implementation of the policies, processes and systems of BYD. All managers are responsible for planning and controlling the management system processes within their area of responsibility, including the establishment and deployment of operational level objectives and the provision of resources needed to implement and improve these processes.

All employees are responsible for the quality of their work and implementation of the policies and procedures applicable to processes they perform. Employees are motivated and empowered to identify and report any known or potential problems and to recommend related solutions to aid the corrective and preventive action process.

Internal Communication

BYD communicates information internally regarding our QMS and its effectiveness, through documented training, internal audit reports and continual improvement processes. All managers are responsible for establishing regular formal and informal communications as needed to convey to their employees the relevance and importance

of their activities; typically this information is conveyed through team meetings and cross-functional improvement projects.

Communications regarding how employees contribute to the achievement of objectives are also conveyed and reinforced during employee performance reviews. Issues pertaining to our QMS that may be communicated internally include:

- Day-to-day operations and general awareness;
- Quality policy;
- Information on achieving objectives and targets;
- Risk and opportunities.

Top management and their direct reports are responsible for communicating the corporate policies as well as the importance of meeting customer, statutory and regulatory requirements to employees within their respective departments. They ensure the quality policy is understood and applied to the daily work of the organization through the establishment of measureable goals and objectives. Internal communication occurs on an on-going basis and is achieved through various mechanisms as appropriate:

- Regular meetings and briefings;
- Training sessions and training material;
- Display boards, memorandums, letters;
- Website, intranet, internal e-mails;
- Product and process performance data analysis and audit results;
- Targets, objectives, KPIs, management system manual and procedures;
- Corrective action and non-conformance reports;
- Minutes of Management Review meetings.

External Communication

BYD, determines the need to communicate information externally to our interested parties, as defined in QM04 Section 3.2, regarding the effectives of our QMS. In most instances, external interested parties (such as consumers, external parties, neighboring communities, etc.) are the main driving force for our organization to implement our QMS. The various processes or means of external communication may include as appropriate:

Interested Parties	Needs & Expectations	Possible Modes Communication
Customers	Price	Value Publications in media
Owners	Profitability & Growth	Annual Reports or Newsletters of Performance
Suppliers	Beneficial Relationships	Publication on the Web meetings or questionnaires
Regulatory & Statutory	Compliance & Reporting	Regulatory Compliance Submissions or results of audits

BYD, ensures that all external communications are authorized prior to release. Where required, advice appropriate to the context of the communication may be sought concerning the content and dissemination of certain external communications. Responses to external communications are recorded if they are transmitted by email or letter. In each case the response is retained and controlled in accordance with the requirements for documented information.

Addressing Risks & Opportunities

The overall aim of risk and opportunity management within BYD is to ensure that organizational capabilities and resources are employed in an efficient and effective manner to take advantage of opportunities and to mitigate risks.

Top management are responsible for incorporating risk based thinking into our organization's culture. This includes the establishment of risk management policies and targets to ensure effective implementation of risk and opportunity management principles and activities by:

- Providing sufficient resources to carry out risk and opportunity management activities;
- Assigning responsibilities and authorities for risk and opportunity management activities;
- Reviewing information and results from audits and risk and opportunity management activities.

The scope of BYD risk and opportunity management process includes the assessment of the internal and external issues identified in QM04 Section 3.1, and the assessment of the needs and expectations of any interested parties identified in QM04 Section 3.2. Risk and opportunity management is undertaken as part of BYD day-to-day operations and is captured at the following hierarchy:

- Strategic level;
- Program level;
- Department level;
- Process level;

Establishing such a hierarchy for capturing risk and opportunity ensures that each is managed at the most appropriate level within our Organization. Typically, the following categories are assigned to each level in the hierarchy as shown in the table opposite.

Business Hierarchy	**Risk Opportunity**
Strategic Level	Budget and Profitability
Program Level	Performance and Efficiency
Department Level	Resources and Targets
Process Level	Evaluation and assurance

BYD has classified its 'risk appetite' as the amount of risk that we are willing to accept in pursuit of an opportunity or the avoidance of risk where each pertains to product and/or system conformity, and which reflect the following considerations:

- Risk management philosophy per product or process;
- Capacity to take on or mitigate risk;
- Our objectives, business plans and respective customer demands;
- Evolving industry and market conditions;
- Tolerance for failures.

BYD uses Management and Engineering Groups to help record, assess, respond, review, report, monitor and plan for the risks and opportunities that we perceive to be relevant. The Management and Engineering Groups allow our organization to methodically assess each risk and to study each opportunity associated with our organizational context, and the needs and expectations of our interested parties. The Management and Engineering Groups record the controls and treatments of risks and opportunities and preserves this knowledge as documented information.

Quality Objectives

BYD sets out its objectives and targets on a regular basis within the management review minutes where details of program dates and responsibilities are defined. Improvements in quality and performance are incremental and are in keeping with the size and complexity of our organization.

When setting objectives and targets, our organization ensures that they are consistent with the needs and expectations of our interested parties, as defined in QM04 Section 3.2, and to our corporate policies. In addition, technological options, financial, operational and business requirements are considered.

In order to determine whether or not our objectives and targets are being met, they are measured and reported as a set of key performance indicators (KPI). This allows progress to be monitored as metrics are gathered and data is analyzed. KPIs and objectives for our organization include the following aspects:

- Turnover & profitability;
- Sales targets & production efficiency targets:
- Reject and rework & cost of quality targets;
- Staffing breakdown.

On the basis of the set quality policies and in connection with the application of the ISO 9001 quality management principles, BYD sets quality objectives that are specified in the register of objectives. All employees are responsible for fulfillment of the quality policies and subsequent objectives. Managers of all departments are obliged to develop general objectives into objectives applicable to their departments and employees.

The quality management system is planned and implemented in order to meet our corporate objectives and the requirements of ISO 9001:2015. The planning process involves establishing and communicating our policies, objectives and associated operational procedures.

This document constitutes our overall plan for establishing, maintaining and improving the quality management system. For each instance of management system planning, the output is documented and retained accordingly and changes are conducted in a controlled manner. The management review and the internal audit processes ensure that the integrity of the QMS is maintained when significant changes are planned which may affect key processes.

Whenever quality management system changes are planned, top management ensures that all personnel are made aware of any changes which affect their process, and that subsequent monitoring is undertaken to ensure that QMS changes are effectively implemented.

Resources

Resources at BYD include human resources and specialized skills, infrastructure, technology, work environment tools, equipment and financial resources. The resource requirements for the implementation, management, control and continual improvement of the quality management system, and activities necessary to enhance customer satisfaction, are defined in our operational procedures, work instructions and this QMS manual:

- Planning
- Management review
- Human resources
- Infrastructure
- Work environment
- Planning of product realization
- Determination of customer requirements

People

To ensure competence of our personnel, job descriptions have been prepared identifying the qualifications, experience and responsibilities that are required for each position that affects product and system conformity. Qualifications include desired requirements for education, skills and experience. Appropriate qualifications, along with the provision of any required training, provide the competence required for each position.

Qualifications are reviewed upon hire, when an employee changes positions or the requirements for a position change. The Human Resources Manager maintains records of employee qualifications. If any differences between the employee's qualifications and the requirements for the job are found, training or other action is taken to provide the

employee with the necessary competence. The results of training are then evaluated to determine if it was effective.

All employees are made aware of the relevance and importance of their activities and how they contribute to the achievement of our policies and objectives. The company operates a formal system to ensure that all employees within the organization are adequately trained to enable them to perform their assigned duties.

Staff training records are maintained to demonstrate competency and experience. The Training department maintains and reviews the training records to ensure completeness and to identify possible future training needs. Training records are maintained and include as a minimum; copies of certificates for any training undertaken to date, current job description and curriculum vitae.

Competence

Top management identifies emerging competency needs during management reviews. Emergent competency needs are converted into job descriptions for the type and number of positions that need to be filled through internal or external recruitment.

Where required; competency training and monitoring is conducted in-house, although for more specialist skills, external courses are utilized. The effectiveness of training is evaluated and recorded. The company induction includes an introduction to our policies and objectives. Future competency training needs are identified as part of the Management Review process.

Awareness

All employees are trained on the relevance and importance of their activities and how they contribute to the achievement of our policies and objectives. The company operates a formal system to ensure that all employees within the organization are adequately trained to enable them to perform their assigned duties.

Where required; awareness training and monitoring is conducted in-house, although for more specialist skills, external courses are utilized. The effectiveness of awareness training is evaluated and recorded. The company induction includes an introduction to our organization's policy statements and objectives. Future training needs are identified as part of the management review process.

Infrastructure

BYD is responsible for planning, providing and maintaining the resources needed to achieve product and process conformance, including buildings, workspace and associated utilities; process equipment (hardware and software); and supporting services. The General Manager has overall responsibility for managing our services.

Operational Environment

BYD ensures that our facility complies with relevant health and safety regulations. The Safety Department carries out regular compliance audits to ensure that appropriate standards are maintained. Top management is committed to providing:

- A place of work that is safe, including all equipment and methods of work;
- Training, instruction, information and supervision for employees;
- A means of safe handling, storage, use and transportation of equipment, materials and chemicals;
- Safe working environment with good lighting, ventilation, safe passageways, stairs and corridors.

Organizational Knowledge

BYD recognizes that organizational knowledge is a valuable resource that supports our quality management activities and ensures continual product and service conformity. There is a strong link between organizational knowledge and the competence of our people, the latter being peoples' ability to apply knowledge to their work.

To ensure that organizational knowledge is retained and transferred, organizational knowledge is recorded in documented information, and is embedded in our processes, products and services. Examples of organizational knowledge include:

- Documented information regarding a process, product or service;
- Previous specifications and work instructions;
- The experience of skilled people and their processes and operations;
- Knowledge of technologies and infrastructure relevant to our organization.

Sources of internal knowledge also include our intellectual property; knowledge gained from experience and coaching; lessons learned from failures and successes; capturing and sharing undocumented knowledge and experience; the results of improvements in processes, products and services.

Sources of external knowledge often include other ISO standards; research papers; webinars from conferences; or knowledge gathered from customers, other external parties. BYD determines and reviews internal and external sources of knowledge, such as:

- Lessons learned from non-conformities, corrective actions, and the results of improvement;
- Gathering knowledge from customers, suppliers and partners;
- Capturing knowledge existing within the organization, e.g. through mentoring/succession planning;
- Sharing knowledge with relevant interested parties to ensure sustainability of the organization;

Knowledge from conferences, attending trade fairs, networking seminars, or other external events.

Operational Planning & Control

BYD establishes and implements documented plans and procedures that describe the processes and the controls required for the provision of services in awareness to the objectives, the potential for planned or unintended change, and the risks and opportunities identified. During this planning phase, management or other responsible personnel identify the following parameters:

- Objectives and requirements for the service;
- Verification, validation, monitoring, inspection and test requirements;
- Documented information to demonstrate conformity;
- Document information to demonstrate process effectiveness;
- Necessary resources; or outsourced processes and their controls;
- Criteria for process performance and product/service acceptance;
- Potential consequences and mitigation to change affecting input requirements;
- Resources necessary to support the ongoing operation of the service.
- The output of planning activity includes documented plans, resource schedules, process, requirements and procedures.

Customer Communication

In accordance with our commitment to exceed our customer's expectations, BYD highlights effective customer communication as an essential element of delivering customer satisfaction. Appropriate handling of customer communication helps to reduce customer dissatisfaction and in many cases turn a dissatisfying scenario into a satisfying experience. Customer communication occurs through the following formats, events and processes:

- Brochures, specifications or technical data sheets relating to our products and services;
- Enquiries, quotations and order forms, invoices and credit notes;
- Confirmation of authorized orders and amended orders;
- E-mails, letters and general correspondence;
- Customer feedback and complaints management process;

Management is responsible for establishing methods of communication with our customers to ensure enquiries, contracts or order handling; including amendments, customer feedback and complaints are handled expeditiously and professionally.

Determining Requirements

BYD develops appropriate requirements to ensure that we satisfy the needs and expectations of our customers or relevant interested parties. BYD ensures that customer requirements are clearly articulated and that their requirements are captured and understood before the acceptance of an order. Customer requirements include the following:

- Previous customer requirements
- Statutory and regulatory requirements related to the product;
- Other non-customer specified performance requirements;
- Any additional requirements determined by BYD

Review of Requirements

Prior to committing to the customer, BYD ensures and confirms our capacity to supply the required product or service. Pre-acceptance reviews are conducted to ensure that:

- Product requirements are defined and are appropriate;
- Any additional requirements determined by BYD are appropriate;
- Contract or order requirements differing from those previously expressed are resolved;
- BYD has the ability to meet the defined requirements;
- Documented information is retained and maintained showing the results of the review.

Customer requirements are confirmed before acceptance by the exchange of contracts, purchase orders via appropriate electronic or hard copy formats.

Changes in Requirements

BYD ensures that all relevant documented information; relating to changes in product or service requirements, is authorized and amended where necessary, and that all relevant personnel are made aware of the documented requirement changes.

Design and Development

Planning

BYD, has determined the stages and controls for design and development. This organization has considered the intricacies of the design and development activities and the requirements and stages needed for this process. The respective review points for verification and validation and persons responsible for the development process have been determined. The internal and external communication with BYD and interested

parties has been established throughout this process. The commitment to customer and external party's involvement is crucial in meeting customer satisfaction, the ultimate goal BYD. All documents internally and externally kept meet and ensure complete compliance with all legal and other requirements.

Inputs

BYD, has determined the essential requirements for this type of production development as well and functional and performance requirements. Where applicable all state and federal requirements and any standards or codes of practice that this organization has committed to implement. The internal and external resource needs for this production and services, any corrections needed to keep production on line with the specifications. Management's commitment to conformity with meetings the customers' expectations and any relevant parties. All documents internally and externally kept meet and ensure complete compliance with all legal and other requirements.

Controls

BYD, in the design and development process there are clear instructions on designing the bus or coach from the customer's contractual guidelines. Production quality controls are scheduled in respective areas to assess production controls throughout the process. Documentation is collected to provide proof that the productivity meets the recommendations for design and development. Affirmation is conducted to provide that the outcome from production is capable of meeting the requirements for the specified application. All documents internally and externally kept meet and ensure complete compliance with all legal and other requirements.

Outputs

BYD, ensures that the design and development manufacturing meets the proposed design guidelines requested by the customer. Any and all product produced consecutively from the original prototype will follow the same processes for the provision of products and services. Quality controls are in place to note the guidance and allowances demanded for this product. Where applicable all state and federal requirements and any standards or codes of practice that this organization has committed to implement. All documents internally and externally kept meet and ensure complete compliance with all legal and other requirements.

Changes

BYD, has oversight and determination for all changes made to design guidelines and production during the design and development of products and services or subsequently, to the extent that there is no negative impact on conformity to the customers' requirements. All documents internally and externally kept meet and ensure complete compliance with all legal and other requirements.

Control of Suppliers & External Processes

The procurement process is essential to our organization's ability to provide our customers with products and services that meet their requirements. BYD ensures that all purchased products or services that are incorporated into our final products; conform to our specified requirements.

BYD accomplishes this by closely working with a network of external clients. Performance and capability are continually assessed through periodic, 2nd party audits, performance data analysis and inspection or verification of the supplied services.

The type and extent of control applied to our suppliers and the purchased service is dependent upon the effect that the outsourced service may have on our final service. The following considerations are taken into account by:

- Ensuring that we understand the capabilities and competencies;
- Ensuring that we clearly communicate the roles and responsibilities;
- Defining the quality requirements for the outsourced activity;
- Selecting and qualifying appropriate suppliers.

It is the responsibility of the Procurement Department to evaluate and select suppliers based on their ability to supply services in accordance with specified requirements. Additionally, other internal resources may be called on to assist as required. The criteria for the selection, evaluation and reevaluation are defined in the Procurement procedure (QP-09), while records of the results of evaluations and any necessary actions arising from the evaluation are maintained.

Purchasing Controls

Purchased items are checked against the purchase BOM to confirm identity and quantity. In the event that items are rejected on receipt, a non-conformance report is raised and the supplier contacted to arrange replacement or credit. BYD has established and implemented a process of inspection to ensure that purchased products conform to:

- Product specifications;
- National or international standards.

Where appropriate, risk control measures are applied to outsourced processes. Risk control measures, and their importance, are documented within the purchasing data and clearly communicated to the supplier.

Purchasing Information

BYD uses purchase orders to describe the service to be purchased. Designated individuals within the company create purchase orders using the company system. They also ensure the adequacy of the requirements that are specified by the purchase order prior to release. Each purchase order includes where appropriate:

- Identification of product or service to be delivered, quantity, delivery date, and cost;
- Requirements for approval or qualification of product, procedures, processes or equipment;
- Requirements of the quality management system and the qualification of personnel.

Production & Service Provision

In order to control the planning, administrative support and implementation of work, our organization's policy is to describe the work methods, the controls applied and the records required. The process control activities are quality with many aspects that also relate to quality control. The following controlled conditions are applied where applicable:

- Quality control checks are performed;
- Evidence of completed inspections;
- Detailed process work instructions and specifications for all products;
- Criteria for workmanship and competence.

In cases where special processes are employed where the results of which cannot be easily checked, including any processes where deficiencies become apparent only after the service is in use validation demonstrates the ability of these processes to achieve planned results by:

- Defining qualification criteria and approval of special processes prior to use;
- Defining criteria for review and approval of the processes;
- Approval of equipment and qualification of personnel;
- Requirements for records;
- Revalidation

Identification & Traceability

In order to preserve the conformance of service provided to customer requirements during internal processing and delivery, BYD identifies the product throughout the product realization:

- Stored data and materials are identified as to job, description and compliance status;
- All enquiries are noted on the company database;
- Subsequent orders are identified by contract number.

Customer Property

We identify, verify, protect and maintain customer property provided for use. The Project Manager ensures that lost, damaged or unsuitable customer property is recorded and immediately reported to the customer.

Customer property can also include customer-owned materials, tools (including packaging), tooling (including test/inspection tooling and equipment), and intellectual property.

Post-delivery Activities

BYD determines customer requirements before acceptance of an order. Customer requirements include the following:

- Previous customer requirements;
- Statutory and regulatory requirements related to the product;
- Any additional requirements determined by BYD

Control of Changes

Changes to the design and development requirements are identified and recorded. Any changes are reviewed, verified, validated and approved. The review of design development changes includes evaluating the effects of those changes upon constituent products already delivered. All results relating to the review of changes are retained as documented information.

Release of Products & Services

The Quality Manager has overall responsibility for planning and implementing the inspection and test activities needed to verify that product requirements are met at appropriate stages of the product realization process.

Services are not used until verified as fully compliant.

Documented information is retained to indicate the person authorizing the release of the service. Service delivery does not proceed until all compliance have been satisfactorily completed, unless otherwise approved by a relevant authority, and where applicable by the customer.

Measurement and acceptance criteria that are necessary for service acceptance are retained as documented information; subsequent acceptance records form the production documentation evidence which includes the following information:

- Criteria for acceptance and rejection;

Control of Non-conforming Outputs

It is our organization's policy to detect, control and rectify any aspect of an output that does not conform as quickly and efficiently as possible. Where necessary, any service output that does not conform to requirements is properly identified and controlled to prevent unintended use. The nonconformity is analyzed and the cause(s) are investigated.

Improvement actions are implemented to ensure the non-conformance does not reoccur. Once the non-conforming outputs are corrected, the outputs are then verified for conformity against requirements. Documented information concerning the nature of any non-conformances, the resolving authority, and the resulting corrective actions is retained. Where necessary, details concerning any authorized concessions are documented as evidence of acceptance.

Monitoring, Measurement, Analysis & Evaluation requirements

BYD, applies suitable methods for determining which aspects of the quality management system and its processes are to be monitored, measured and evaluated. The frequency and methods by which our processes are monitored, measured and evaluated is determined and informed by:

- Statutory and regulatory requirements;
- Customer feedback and specification requirements;
- Process and QMS requirements;
- Process performance and audit results;
- Level of risk and types of control measure;
- Trends in non-conformities or corrective actions;
- Criticality for service conformity.

All monitoring, measuring and evaluation outputs are documented and analyzed to determine process effectiveness and to ensure their effectiveness in achieving in-tolerance results, and to identify opportunities for improvement:

- In-process checks relate to both quality control and productivity checks;
- Provision is made for the identification and resolution of non-conformances;
- The emphasis is to prevent any problems which might affect customer satisfaction;
- In-process checks are performed and documented;

Where applicable, records are retained as documented information for a minimum of three years. This documented information includes details of the final inspection authority to confirm that all critical parameters were in accordance with established requirements and specifications. Services are not normally delivered until all compliance have been completed and that documented information exists to provide evidence of conformity with acceptance criteria and identifying the person(s) authorizing release.
Customer Satisfaction

The General Manager monitors information and trends relating to customer perception as to whether the organization has fulfilled the customers' requirements. Customer complaints, whether received in writing, verbally or electronically through our website's are immediately forwarded to the General Manager for action.

Customer survey data along with other customer feedback, including written or verbal complaints and information collected via the customer feedback form are reviewed by the General Manager who initiates appropriate corrective actions. The level of customer satisfaction is monitored using various sources of customer data:

- Repeat customers;
- Analysis of customer complaints;
- Customer satisfaction surveys

Analysis and Evaluation

Top management and other managers and supervisors collect and analyze data using appropriate statistical techniques to determine the suitability and effectiveness of key quality management system processes applicable to their area(s) of responsibility and to identify opportunities for improvement. At a minimum, data is analyzed to assess achievement of the corporate level objectives and customer requirements.

A process is effective if the desired results are measurably achieved. Effectiveness is measured in terms of product quality, process accuracy, delivery schedule performance, cost and budgetary performance, employee function performance against established objectives and levels of customer satisfaction. In order to identify strengths, weaknesses, threats and opportunities in our quality management system, BYD monitors and analyses trends using the following quality data points:

- Characteristics of processes, services and their trends;
- Conformity to product, customer and legal requirements;
- Customer satisfaction and perception data;
- Supplier and external provider performance data;
- Results of actions taken to address risks and opportunities;
- Effective implementation of QMS planning;
- Improvement opportunities identified during internal audits and management reviews;

Control limits for process and product performance are expressed as objectives and disseminated via documented information as appropriate. BYD, undertakes corrective action when the data shows a trend toward the defined control limit. Employees, who utilize statistical tools to analyze; measure and verify outputs, are sufficiently competent to ensure proper deployment of these techniques.

Internal Audit

Internal audit results are critical inputs that help to assess the effectiveness of our quality management system. Internal audits are conducted at planned intervals to determine whether the quality management system conforms to our organization's planned arrangements and to the requirements of ISO 9001:2015.

BYD internal audit program is based upon a strategy that considers the status and importance of each process that comprises our quality management system. The audit frequency is based upon process performance trends, results from previous audits, levels of customer satisfaction, rates of non-conformity and corrective action, etc. to ensure that our organization focuses on the aspects that affect product and process conformity the most. The criteria, scope, frequency and methods of each audit are defined in our audit plan. The selection of trained auditors and their subsequent impartial conduct ensures objectivity throughout the audit process. Each Auditor ensures that:

- The results of each are reported to the General Manager;
- That timely appropriate corrective action undertaken where required;
- They retain documented information such as audit checklists and audit reports as evidence of the effective implementation of the audit program in respect of each audit.

Management Review

To ensure the continuing suitability, adequacy and effectiveness of our quality management system in meeting our organization's strategies, Top management conducts formal management review meetings at planned internals.

Inputs

The primary inputs that are reviewed comprise data from conformance and performance measurements that are gathered at key quality data points from various processes. Subsequent recommendations for improvement are based on the evaluation of such measurements.

Conformance is primarily assured through internal audits and demonstrated through a review of audit results and our demonstrated ability to detect, correct and to prevent problems. Performance is primarily assured through the deployment of corporate and

operational level objectives, and through the review of our demonstrated ability to achieve desired results.

Outputs

The primary outputs of management review meetings are management actions that are taken to make changes or improvements to our quality management system. During management review meetings, top management will identify appropriate actions to be taken regarding the following issues:

- Improvement of the effectiveness of the quality management system and its processes;
- Improvement of product related to customer requirements;
- Opportunities and risks;
- Resource needs

The primary outputs of management review meetings are the actions necessary to make changes or improvements to our quality management system and the provision of resources needed to implement these actions. Responsibilities for required actions are assigned to members of the management review team. Any decisions made during the meeting, assigned actions and their due dates are recorded in the management review minutes.

Improvement

In order to determine and select opportunities for improvement or to implement any necessary actions to meet the requirements of customers and relevant interested parties, or to enhance customer satisfaction, BYD drives improvement via the analysis of relevant data. The data inputs for the improvement process include:

- Risk and opportunity evaluations;
- Assessment of the changing needs and expectations of interested parties;
- The conformity of existing products and services;
- The effectiveness of our QMS;
- Supplier performance;
- Levels of customer satisfaction, including complaints and feedback;
- Internal and external audit results;
- Corrective action and non-conformance rates;

BYD also ensures that opportunities for improvement from daily feedback on operational performance are evaluated by the General Manager which are typically implemented through the corrective action system. Opportunities for improvement from analysis of longer-term data and trends are evaluated and implemented through the management review process and are prioritized with respect to their relevance for achieving our quality objectives.

The overall effectiveness of continual improvement program (including corrective actions taken as well as the overall progress towards achieving corporate level improvement objectives) is assessed through our management review process.

Non-conformity & Corrective Action

Evidence of non-conformance, customer dissatisfaction or service weakness is used to drive our continual improvement system. Since problems may already exist, they will require immediate correction and possible additional action aimed at eliminating or reducing the likelihood of its recurrence.

Management with responsibility and authority for implementing corrective action are notified promptly of product or process non-conformities. Investigating and eliminating the root cause of these failures is a critical part of our continual improvement process.

BYD takes action to eliminate the cause of non-conformities in order to prevent their recurrence. Corrective actions are appropriate to the effects of the non-conformities encountered. The documented Nonconformity and Corrective Action Procedure (QP-11) defines the requirements for:

- Reviewing non-conformities, including customer complaints;
- Determining the causes of product non-conformities and process deficiencies;
- Evaluating the need for action to ensure that non-conformities do not recur;
- Determining and implementing action needed;
- Recording and reviewing the results of actions taken.

Follow-up audits are conducted in accordance with the internal audit process to ensure that effective corrective action is taken and that the action is appropriate to the impact and nature of the problem encountered. In addition, the ISO department summarizes and analyses corrective action data to identify trends in order to assess the overall effectiveness of the corrective action system and to develop related recommendations for improvement.

The resulting corrective actions are reviewed for effectiveness and are reported to Top management in order to determine if changes to the QMS are required, or whether any new risks or opportunities need to be considered during planning. Documented information concerning the nature of any nonconformance's and their resulting corrective actions is retained.

The corrective actions are considered effective if the specific problem was corrected and data indicates that the same or similar problems have not recurred. Results of data analysis and subsequent recommendations are presented to top management for review.

Improvement

BYD continually improves the effectiveness of its quality management system through the effective application of the corporate policies, objectives, auditing and data analysis, corrective and preventive actions and management reviews.

The continual improvement process begins with the establishment of our corporate policies and objectives for improvement, based on objectives contained in our business plan and customer targets and goals. Customer satisfaction, internal audit data, process and product performance data, and the cost of poor quality or risk control are then compared against objectives or KPIs to identify additional opportunities for improvement.

The overall effectiveness of continual improvement program, including corrective actions taken, as well as the overall progress towards achieving corporate level improvement objectives, are assessed through our management review process.

Appendix A: Quality Procedures (Summaries)

1. QP-01 – Control of Documents – Establishes controls for BYD's documentation process in order to ensure accuracy, legibility, record and traceability requirements.

2. QP-02 – Training – Establishes training requirements for all personnel effecting the Quality Management System in order to ensure competency requirements.

3. QP-03 – Non-Conforming Control Procedure – This procedure establishes controls which identify, segregate, and process materials that are non-conforming.

4. QP-04 – Engineering Change Control Procedure – This procedures establishes controls for the process of making Engineer Changes which include design and process changes.

5. QP-05 – Record Control Procedure – This procedure establishes controls, specifically for bus build, inspection and test records, to ensure traceability and record retention requirements are met.

6. QP-06 – Calibration – This procedure identifies and establishes calibration requirements for monitoring and measuring resources (tools, equipment, etc.).

7. QP-07 – Incoming Material Inspection – This procedure outlines the process for Incoming Quality Control. After material is received, it goes through a quality inspection to ensure suitability according to requirements.

8. QP-08 – In-Process & Inspection Control – This procedure outlines the In-Process quality inspection controls.

9. QP-09 – Procurement – This procedure outlines the procurement of materials process including vendor selection, approval and evaluation.

10. QP-10 – Identification & Traceability Control Procedure – This procedure outlines the process for identification of materials, process status, tooling/equipment compliancy, etc. It also outlines how BYD maintains traceability requirements with bus, equipment and tooling records.

11. QP-11 – Nonconformity and Corrective Action Procedure – This procedure outlines the process for identifying nonconformities and the actions taken to limit/control/contain them and prevent future occurrences.

12. QP-12 – Continual Improvement Procedure – This procedure outlines BYD's objective to enhance products and services. Through KPI's (Key Performance Indicators), audits and analyses, we identify areas in need of improvement and make evidence based decisions on when and how to improve.

13. QP-13 – Customer Satisfaction Control – This procedure outlines the steps taken for the methods to receive/gather, analyze/evaluate, and improve Customer Satisfaction.

14. QP-14 – Warehouse Management – This procedure outlines the process for receiving, identifying, storing, inventory and distribution of materials by the Warehouse department.

15. QP-15 – Management Review – This procedure outlines the procedure for performing management review meetings which are done to evaluate the status of BYD's Quality Management System and determine areas for change and improvement.

16. QP-16 – Internal Audit – This procedure outlines BYD's internal audit program which audits the effectiveness of BYD's processes and overall Quality Management System. The internal audit program is the primary way BYD detects and records non-conformities of its processes in order to implement corrective actions.

17. QP-17 – Paint Inspection – This procedure outlines the steps to insure paint inspections are done at various stages to ensure conformity and limiting defects.

18. QP-18 – Customer Service – This procedure outlines the customer service process which includes coordination of bus delivery and bus warranty work, customer communication and customer concerns.

19. QP-21 – Design & Development – This procedure outlines the process of design & development and how BYD determines and ensures that all statutory and regulatory requirements are met.

20. QP-22 – Risk Management – This procedure outlines the process for risk-based decision making for planning and for changes within the QMS.

21. QP-23 – Supplier Quality Engineering – This procedure outlines the monitoring and evaluation process supplier quality for vendor supplied materials.

22. QP-24 – Logistics – This procedure outlines the process for the logistical communication and coordination for delivery or return of buses and other freight requirements.

23. QP-25 – Bus Manual Procedure and Flowchart – This procedure outlines the process for creating, reviewing and issuing bus manuals.

24. QP-26 – Purchasing – This procedure outlines the process for the purchasing of raw materials and other tooling, supplies or equipment needed to meet BYD's QMS requirements.

25. QP-27 – Project Transfer to Customer Service Procedure – This procedure outlines the process and protocol for project responsibility to be transferred from Project Management to Customer Service.

26. QP-28 – Other Deliverable Procedure – This procedure outlines the process for the provision and delivery of “other deliverables” such as accessories, tools or equipment that is to be provided to the customer which are typically items not installed on the bus.

27. QP-29 – Part Removal Procedure – This procedure outlines the process and controls for removing a part from a bus. This is usually only done because a part on a preceding bus for the same project is defective and needs the part for delivery.

28. QP-30 – Return Bus Procedure – This procedure outlines the process for BYD production facility to process return buses from the customer for repair or warranty work.

ADDTIONAL COST RELATED INFORMATION

BUS PRICING: OPTION YEARS 2 - 5

BYD Base Bus Battery Usable Capacity
Option Bus

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
1	Cost of (1) 29FT/30FT, low floor, all electric bus, per the specifications	**BASE BUS BYD K7M-ER Usable capacity: 266 kWh**	1	$ 630,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
2	Cost of (1) 35FT, low floor, all electric bus, per the specifications	**BASE BUS BYD K8M Usable capacity: 391 kWh**	1	$ 750,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
3	Cost of (1) 40FT, low floor, all electric bus, per the specifications	**BASE BUS BYD K9M Usable capacity: 313 kWh**	1	$ 730,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
4	Cost of (1) 45FT, all electric bus, per the specifications	**BASE BUS BYD Coach C10M Usable capacity: 446 kWh**	1	$ 950,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
5	Cost of (1) 60FT (articulated), low floor, all electric bus, per the specifications	**BASE BUS BYD K11M Usable capacity: 578 kWh**	1	$ 1,200,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*
Option 40FT Bus								
Option	Cost of (1) 40FT, low floor, all electric bus, per the specifications	**BASE BUS BYD K9MD Usable capacity: 446 kWh**	1	$ 810,000.00	PPI Pricing*	PPI Pricing*	PPI Pricing*	PPI Pricing*

Note: The Index shall be **the Producer Price Index for Truck and Bus Bodies**, Series No. 1413, published by the United States Department of Labor, Bureau of Labor Statistics, or if such Index is no longer in use, then such replacement that is most comparable to the Index as may be designated by the Bureau of Labor Statistics, or as agreed by the parties. Any increase as determined by the **Producer's Price Index (PPI)** shall be limited to a maximum of five percent (5%) per year

ALTERNATIVE / Add-ons TS 84.2 A camera system and TS 84.3 Automatic Passenger Counter are listed in CER 6. Pricing Schedule. (Not included in above Base Bus Price)

Pricing Schedule for years 2-5
Most vendors have agreed to honor pricing for year 1 after that they are subject to increases based on raw material cost and labor cost.
Only Sportworks and Genfare will honor pricing into year 2.

Line Item	Description	Part #	QTY	Yr1	Yr2	Yr3	Yr 4	Yr5
66	BIKE RACKS	Bike Rack Deployed Indicator Lamp on Driver's Dash	1	$ 35.00	$ 35.00	Quote	Quote	Quote
67	BIKE RACKS	Sportworks APEX 2, 2-Position, Stainless Steel	1	$ 1,190.01	$ 1,190.01	Quote	Quote	Quote
68	BIKE RACKS	Sportworks APEX 2, 2-Position, Powder Coated	1	$ 1,170.21	$ 1,170.21	Quote	Quote	Quote
69	BIKE RACKS	Sportworks DL2, 2-Position, Powder Coated	1	$ 872.22	$ 872.22	Quote	Quote	Quote
70	BIKE RACKS	Sportworks APEX3, 3-Position, Stainless Steel	1	$ 1,503.84	$ 1,503.84	Quote	Quote	Quote
71	BIKE RACKS	Sportworks APEX 3, 3-Position, Powder Coated	1	$ 1,407.81	$ 1,407.81	Quote	Quote	Quote
72	BIKE RACKS	Sportworks Trilogy (DL3), 3-Position, Stainless Steel	1	$ 1,935.48	$ 1,935.48	Quote	Quote	Quote
73	BIKE RACKS	Sportworks Trilogy (DL3), 3-Position, Powder Coated	1	$ 1,419.69	$ 1,419.69	Quote	Quote	Quote
264	FARE COLLECTION	GFI 41" Tall Odyssey	1	$ 17,433.30	$ 17,433.30	Quote	Quote	Quote

BUS PRICING: BATTERY LEASING OPTION

Pinellas Suncoast Transit Authority, (FL)

Date: 9/19/2021
Batter Lease Quote
By: David J. Clamage

Note: All payments are subject to change with market conditions; assume a minimum financed amount of $1 Million; and, confirmation the Lessee is contracting as a governmental entity

Usable kWh	215	228	266	313	352	391	446	578
ESS Price	$280,000.00	$285,000.00	$300,000.00	$320,000.00	$340,000.00	$360,000.00	$380,000.00	$500,000.00

Lease Term in Years	Payment per Month							Interest Rate
2	$ 12,030.39	$ 12,245.21	$ 12,889.70	$ 13,749.01	$ 14,608.33	$ 15,467.64	$ 16,326.95	$ 21,482.83	2.965%
3	$ 8,106.30	$ 8,251.05	$ 8,685.32	$ 9,264.34	$ 9,843.36	$ 10,422.38	$ 11,001.40	$ 14,475.53	2.704%
4	$ 6,147.73	$ 6,257.51	$ 6,586.85	$ 7,025.98	$ 7,465.10	$ 7,904.23	$ 8,343.35	$ 10,978.09	2.596%
5	$ 4,975.43	$ 5,064.28	$ 5,330.82	$ 5,686.21	$ 6,041.59	$ 6,396.98	$ 6,752.37	$ 8,884.70	2.550%
6	$ 4,196.31	$ 4,271.24	$ 4,496.04	$ 4,795.78	$ 5,095.52	$ 5,395.25	$ 5,694.99	$ 7,493.40	2.536%
7	$ 3,641.90	$ 3,706.93	$ 3,902.03	$ 4,162.17	$ 4,422.30	$ 4,682.44	$ 4,942.57	$ 6,503.39	2.539%
8	$ 3,227.97	$ 3,285.61	$ 3,458.54	$ 3,689.11	$ 3,919.68	$ 4,150.25	$ 4,380.82	$ 5,764.23	2.555%
9	$ 2,907.73	$ 2,959.66	$ 3,115.43	$ 3,323.12	$ 3,530.82	$ 3,738.52	$ 3,946.21	$ 5,192.38	2.578%
10	$ 2,653.11	$ 2,700.49	$ 2,842.62	$ 3,032.13	$ 3,221.64	$ 3,411.14	$ 3,600.65	$ 4,737.70	2.606%
11	$ 2,446.24	$ 2,489.92	$ 2,620.97	$ 2,795.70	$ 2,970.43	$ 3,145.17	$ 3,319.90	$ 4,368.29	2.639%
12	$ 2,275.21	$ 2,315.84	$ 2,437.72	$ 2,600.24	$ 2,762.75	$ 2,925.27	$ 3,087.78	$ 4,062.87	2.674%

Warranty Cost

STANDARD LIMITED WARRANTY & EXTENDED COVERAGE PERIODS

This warranty covers 100% of the material (with exception to vulnerable consumable parts, friction material), workmanship and any associated freight costs during the warranty time period identified below.

Major Component & Subsystem	Description (what is covered)	BYD Standard Warranty Period (which occurs first)		RFP Required Warranty Period (which occurs first)			Optional Extended Warranty & Cost		
		Years	Miles	Years	Miles	Extended Cost (USD)	Years	Mileage	Cost (USD)
Complete Bus	Starter：N/A Fire suppression: Amerex Hydraulic systems All parts with exception to components or subsystems noted below.	2	100,000	1	500,000				
Basic Bus Structure	Body, and body structure shall consist of the components that are mechanically fastened or adhesively bonded or glued as part of the structure.	3	150,000	12	500,000	$9,675.00			
Chassis Structure (Integrity)	Consists of all components that are welded together to form the main frame (skeleton) and body construction. The structural integrity guarantee covers against a significant loss of structural integrity of the assembly or its functional performance due to non corrosion related failures.	12	500,000	12	500,000				
Chassis Structure (Corrosion)	Consists of all components that are welded together to form the main frame (skeleton) and body construction. The corrosion guarantee covers against a significant loss of structural integrity of the assembly or its functional performance, resulting from a pertinent loss of cross-section due to corrosion caused by normal environmental elements but excludes corrosion caused by aggressive road de-icers such as Magnesium Chloride or equivalents, unless BYD approved preventative measures are taken.	12	500,000	12	500,000				
Propulsion System/Drive Axle	Drive motor/s, hub reduction gear assembly, gearbox, gearbox housing assembly Requires supporting documentation of PM records	5	250,000	2	/				
High-Voltage Energy Storage System	Remaining rate of usable battery capacity >70%. There is no limitation on gross discharging kWh throughout warranty period.	12	Unlimited	6	/				
High-Voltage Components & Control System	Drive motor controller, Bidirectional inverter charge-discharge motor controller, DC and auxiliary motor controller assembly, Service plug assembly, High-voltage distribution box, High-voltage harness, 3-phase cable junction box.	5	250,000	6（Inveter）	/	$1,260.12			
Traction Motor	N/A	/	/	/	/				
Low-Voltage Control System	Vehicle control unit, front auxiliary controller, rear auxiliary controller.	5	250,000	1	/				
Non-Drive Axles	Requires supporting documentation of PM records.	3	150,000	2	100,000				
Defroster System BYD	Defroster, PTC driver, defroster controller	3	150,000	1	/				
Air Conditioning System BYD HVAC	Requires supporting documentation of PM records. Roof and/or rear main unit only, excluding floor heaters and front defroster	3	Unlimited	2	100,000				
Door System Vapor	Excluding maintenance items & items that are not covered by the OEM's warranty Including door operating actuators and linkages	2	Unlimited	2	100,000				
Wheel Chair Lift & Ramp System Ricon	Lift and/or ramp parts and mechanical only.	2	Unlimited	2	100,000				
Destination sign	All destination sign equipment for the front, side and rear signs, power modules and operator control	2	Unlimited	2	100,000				
Brake System	Friction material excluded.	2	100,000	2	100,000				
Flooring Gerflor	The wear layer floorcoverings shall be free from defects in material.	12	Unlimited	1	/				
Charging Interface	BYD 80KW AC charger	6	Unlimited	1	/				
Charging Charger Siemens	On-Route battery charger	2	Unlimited	6	/	Quote			
Air Compressor knorr	Requires supporting documentation of PM records.	2	100,000	2	100,000				
Passenger Seating Excluding Upholstery USSC	5，on Metal Components 3，on Plastic Components and Moving parts 2，on Wheelchair restraints*, polyurethane foam and woven upholstery 1，on ADA Call devices, FTA/Docket 90 foam and vinyl upholstery	2	100,000	2	100,000				
Surveillance System Including Cameras and video Recorders	3，on parts and repair on Mobile View Recorders, Cameras, and Accessories 3，on parts and labor on cameras 3，on parts and labor on Explorer® HX, DX, TX, MX, EX, Premier, and Trooper® TL series mobile DVR Systems 3，on parts and labor for all storage media (including HD) 2，on parts and labor for inView 360™ Around Vehicle Monitoring Systems (including cameras, ECU, and wiring) 1，on parts and labor for Smart Reach® and vMax Pulse Wireless systems and other Wireless products 1，on parts and labor for LMU, VML Controller, Student Tracking RFID reader, other vMax Live Plus and vMax Navigator hardware products.	2	100,000	2	100,000				
				Total extended price		**$10,935.12**	**Optional Total Cost**		**$0.00**

K7M 12 Year Cost of Ownership

BYD K7M-ER-30 FT. 12 YEARS COST ESTIMATE

MILES PER YEAR	LABOR RATE (US$)	YEAR	TOTAL MILEAGE (miles)	FOB TOTAL MATERIAL COST (US$)	FOR TOTAL LABOR COST(US$)	SERVICE AND MAINTENANCE COST PER MILE(US$)	Electricity Rate(kWh) (US$)	kWh/mile	LCC (US$)	LIFE CYCLE COST PER MILE(US$)
41,667	65	12	500,000	$83,652.92	$23,185.50	$0.2137	$0.08	1.65	$172,838.42	0.3457

Maintenance Cost

The interval depends on whichever comes first(time & mileage)					Replacement Times in 12 Years	Material Price	Qty. for Once in Metric Unit	Qty. for Once	Unit	Total Material Price	Labor Hour Per Time	Total Labor Hour
Mileage(×1,000miles)	First Maintenance <3000 Miles(first 3 months)	9	18	36								
/		Every 3 months	Every 6 months	Every 12 months								
Overall inspection	I	I	/	/	56	0	1	1	/	/	2.0	112.0
Lubricate vehicle lubricating points (non-maintenance-free and no centralized lubrication)	/	R	/	/	55	$ 0.39	300g	10.60	OZ	$ 227.37	0.5	27.5
Clean the air conditioner inlet filter	/	C	/	/	55	$ -	1	1	PCS	$ -	0.2	11.0
Clean the condenser of brake system	/	/	C	/	27	$ -	1	1	PCS	$ -	0.2	5.4
Replace the wiper blade	/	/	R	/	27	$ 20.36	2	2	PCS	$ 1,099.17	0.2	5.4
Replace the gear oil	R	/	R	/	28	$ 19.99	6.8L	1.80	GAL	$ 1,007.50	1.0	28.0
Replace the drive motor oil	/	/	R	/	27	$ 8.07	4.6L	4.86	QT	$ 1,058.95	0.5	13.5
Replace the drive motor oil filter	/	/	R	/	27	$ 22.02	2	2	PCS	$ 1,189.08	0.2	5.4
Replace air dryer filter	/	/	/	R	13	$ 111.08	1	1	PCS	$ 1,444.09	0.2	2.6
Replace and check the air filter	/	/	/	R	13	$ 50.98	1	1	PCS	$ 662.74	0.1	1.3
Check and replace oil-gas separator of air compressor	/	/	/	R	13	$ 359.52	1	1	PCS	$ 4,673.76	0.2	2.6
Replace the air compressor oil	/	/	/	R	13	$ 53.17	1.45L	0.39	GAL	$ 269.59	0.3	3.9
Clean fresh air filter and condenser and evaporator filter	/	/	/	C	13	$ -	1	1	PCS	$ -	0.3	3.9
Replace the steering oil filter	/	75K or 24 months			6	$ 33.70	1	1	PCS	$ 202.20	0.2	1.2
Replace the steering oil	/	75K or 24 months			6	$ 20.44	8.0L	8.45	QT	$ 1,036.31	1.5	9.0
Replace the coolant of chassis	/	75K or 24 months			6	$ 17.99	24.0L	6.34	GAL	$ 684.34	2.0	12.0
Replace the coolant of power battery	/	75K or 24 months			6	$ 17.99	39.16L	10.34	GAL	$ 1,116.10	2.0	12.0
Brake rotor(Front)	/	200K			2	$ 352.05	2	2	PCS	$ 1,408.20	3.0	6.0
Brake rotor(Rear)	/	150K			3	$ 205.62	2	2	PCS	$ 1,233.72	6.0	18.0
Replace the brake pads	/	50K			9	$ 518.19	2	2	PCS	$ 9,327.42	3.0	27.0
Replace the 24-V battery	/	75K or 24 months			6	$ 430.53	2	2	PCS	$ 5,166.36	0.5	3.0
Replace the tire	/	50K			9	$ 663.00	6	6	PCS	$ 35,802.00	2.0	18.0
Grease the ZF front axle wheel hub bearing and wheel hub chamber.	/	For 12H series, perform inspection and maintenance every 310,000mile or 48 months.			2	$ 0.90	200g	7.05	OZ	$ 12.69	1.0	2.0
									Total Material Cost 1	$ 67,621.58	65	330.7
											Total Labor Cost 1	$ 21,495.50

Note
I=Inspect R=Replace C=Clean

Part Name	SAP	Designed Life	Replacement Times in 12 Years	Labor Hour	Total Labor Cost	Quantity Per Bus	FOB Price	Total Price(FOB USD$)
A/C Compressor	11569904-00	6	1	2	$ 520.00	4	$ 1,100.48	$ 4,401.92
Power steering gear assembly	10551511-00	10	1	2	$ 260.00	2	$ 1,786.14	$ 3,572.28
Front Thrust Rod	11053471-00	10	1	2	$ 130.00	1	$ 206.22	$ 206.22
Rear Upper Thrust Rod	11864428-00	10	1	2	$ 260.00	2	$ 226.14	$ 452.28
Rear Lower Thrust Rod	11864431-00	10	1	2	$ 260.00	2	$ 226.14	$ 452.28
Air Compressor Assembly	12302016-00	10	1	4	$ 260.00	1	$ 6,946.36	$ 6,946.36
				Total Labor Cost 2	$ 1,690.00		Total Material Cost 2	$ 16,031.34

K8M 12 Year Cost of Ownership

BYD K8M/K9S-35 FT. 12 YEARS COST ESTIMATE

MILES PER YEAR	LABOR RATE (US$)	YEAR	TOTAL MILEAGE (MILES)	FOB TOTAL MATERIAL COST (US$)	FOR TOTAL LABOR COST(US$)	SERVICE AND MAINTENANCE COST PER MILE(US$)	ELECTRICITY RATE(KWH) (US$)	KWH/MILE	LIFE CYCLE COST (US$)	LIFE CYCLE COST PER MILE(US$)
41,667	65	12	500,000	$79,425.79	$22,795.50	$0.2044	$0.08	1.71	$170,621.29	$0.3412

Maintenance Cost

The interval depends on whichever comes first(time & mileage)					Replacement Times in 12 Years	Material Price	Qty. for Once in Metric Unit	Qty. for Once	Unit	Total Material Price	Labor Hour Per Time	Total Labor Hour
Mileage(×1,000miles)	First Maintenance <3000 Miles(first 3 months)	9	18	36								
/		Every 3 months	Every 6 months	Every 12 months								
Overall inspection	I	I	/	/	56	0	1	1	/	/	2.0	112.0
Lubricate vehicle lubricating points (non-maintenance-free and no centralized lubrication)	/	R	/	/	55	$ 0.39	300g	10.60	OZ	$ 227.37	0.5	27.5
Clean the air conditioner inlet filter	/	C	/	/	55	$ -	1	1	PCS	$ -	0.2	11.0
Clean the condenser of brake system	/	/	C	/	27	$ -	1	1	PCS	$ -	0.2	5.4
Replace the wiper blade	/	/	R	/	27	$ 37.07	2	2	PCS	$ 2,001.71	0.2	5.4
Replace the gear oil	R	/	R	/	28	$ 19.99	7.8L	2.06	GAL	$ 1,153.02	1.0	28.0
Replace the drive motor oil	/	/	R	/	27	$ 8.07	4.6L	4.86	QT	$ 1,058.95	0.5	13.5
Replace the drive motor oil filter	/	/	R	/	27	$ 22.02	2	2	PCS	$ 1,189.08	0.2	5.4
Replace air dryer filter	/	/	/	R	13	$ 111.08	1	1	PCS	$ 1,444.09	0.2	2.6
Replace and check the air filter	/	/	/	R	13	$ 50.98	1	1	PCS	$ 662.74	0.1	1.3
Check and replace oil-gas separator of air compressor	/	/	/	R	13	$ 359.52	1	1	PCS	$ 4,673.76	0.2	2.6
Replace the air compressor oil	/	/	/	R	13	$ 53.17	1.45L	0.39	GAL	$ 269.59	0.3	3.9
Clean fresh air filter and condenser and evaporator filter	/	/	/	C	13	$ -	1	1	PCS	$ -	0.3	3.9
Replace the steering oil filter	/	75K or 24 months			6	$ 33.70	1	1	PCS	$ 202.20	0.2	1.2
Replace the steering oil	/	75K or 24 months			6	$ 20.44	8.0L	8.45	QT	$ 1,036.31	1.5	9.0
Replace the coolant of chassis	/	75K or 24 months			6	$ 17.99	24L	6.34	GAL	$ 684.34	2.0	12.0
Replace the coolant of power battery	/	75K or 24 months			6	$ 17.99	24L	6.34	GAL	$ 684.34	2.0	12.0
Brake rotor(Front)	/	200K			2	$ 293.40	2	2	PCS	$ 1,173.60	3.0	6.0
Brake rotor(Rear)	/	150K			3	$ 171.68	2	2	PCS	$ 1,030.08	6.0	18.0
Replace the brake pads	/	50K			9	$ 346.24	2	2	PCS	$ 6,232.32	3.0	27.0
Replace the 24-V battery	/	75K or 24 months			6	$ 430.53	2	2	PCS	$ 5,166.36	0.5	3.0
Replace the tire	/	50K			9	$ 663.00	6	6	PCS	$ 35,802.00	2.0	18.0
Grease the ZF front axle wheel hub bearing and wheel hub chamber.	/	For 12H series, perform inspection and maintenance every 310,000mile or 48 months.			2	$ 0.90	200g	7.05	OZ	$ 12.69	1.0	2.0
									Total Material Cost 1	$ 64,704.55	65	330.7
											Total Labor Cost 1	$ 21,495.50

Note
I=Inspect R=Replace C=Clean

Part Name	SAP	Designed Life	Replacement Times in 12 Years	Labor Hour	Total Labor Cost	Quantity Per Bus	FOB Price	Total Price(FOB USD$)
A/C Compressor	11569904-00	6	1	2	$ 520.00	4	$ 787.56	$ 3,150.24
Right Steering Gear Box	10881105-00	5	2	2	$ 260.00	1	$ 1,578.02	$ 3,156.04
Front Thrust Rod	11053471-00	10	1	1	$ 130.00	2	$ 488.35	$ 976.71
Rear Upper Thrust Rod I	11459831-00	10	1	1	$ 130.00	2	$ 122.97	$ 245.95
Rear Upper Thrust Rod II	11459852-00	10	1	1	$ 130.00	2	$ 122.97	$ 245.95
Air Compressor Assembly	12302016-00	10	1	2	$ 130.00	1	$ 6,946.36	$ 6,946.36
				Total Labor Cost 2	$ 1,300.00		Total Material Cost 2	$ 14,721.24

K9M and K9MD 12 Year Cost of Ownership

BYD K9MD-40 FT. 12 YEARS COST ESTIMATE

MILES PER YEAR	LABOR RATE (US$)	YEAR	TOTAL MILEAGE (MILES)	FOB TOTAL MATERIAL COST (US$)	FOR TOTAL LABOR COST(US$)	SERVICE AND MAINTENANCE COST PER MILE(US$)	ELECTRICITY RATE(KWH) (US$)	KWH/MILE	LIFE CYCLE COST (US$)	LIFE CYCLE COST PER MILE(US$)
41,667	65	12	500,000	$79,076.14	$22,795.50	$0.2037	$0.08	2.08	$185,071.64	$0.3701

Maintenance Cost

The interval depends on whichever comes first(time & mileage)					Replacement Times in 12 Years	Material Price	Qty. for Once in Metric Unit	Qty. for Once	Unit	Total Material Price	Labor Hour Per Time	Total Labor Hour
Mileage(×1,000miles)	First Maintenance <3000 Miles(first 3 months)	9	18	36								
/		Every 3 months	Every 6 months	Every 12 months								
Overall inspection	I	I	/	/	56	0	1	1	/	/	2.0	112.0
Lubricate vehicle lubricating points (non-maintenance-free and no centralized lubrication)	/	R	/	/	55	$ 0.39	300g	10.60	OZ	$ 227.37	0.5	27.5
Clean the air conditioner inlet filter	/	C	/	/	55	$ -	1	1	PCS	$ -	0.2	11.0
Clean the condenser of brake system	/	/	C	/	27	$ -	1	1	PCS	$ -	0.2	5.4
Replace the wiper blade	/	/	R	/	27	$ 37.07	2	2	PCS	$ 2,001.71	0.2	5.4
Replace the gear oil	R	/	R	/	28	$ 19.99	6.6L	1.74	GAL	$ 973.91	1.0	28.0
Replace the drive motor oil	/	/	R	/	27	$ 8.07	4.6L	4.86	QT	$ 1,058.95	0.5	13.5
Replace the drive motor oil filter	/	/	R	/	27	$ 22.02	2	2	PCS	$ 1,189.08	0.2	5.4
Replace air dryer filter	/	/	/	R	13	$ 111.08	1	1	PCS	$ 1,444.09	0.2	2.6
Replace and check the air filter	/	/	/	R	13	$ 50.98	1	1	PCS	$ 662.74	0.1	1.3
Check and replace oil-gas separator of air compressor	/	/	/	R	13	$ 359.52	1	1	PCS	$ 4,673.76	0.2	2.6
Replace the air compressor oil	/	/	/	R	13	$ 53.17	1.45L	0.39	GAL	$ 269.59	0.3	3.9
Clean fresh air filter and condenser and evaporator filter	/	/	/	C	13	$ -	1	1	PCS	$ -	0.3	3.9
Replace the steering oil filter	/	75K or 24 months			6	$ 33.70	1	1	PCS	$ 202.20	0.2	1.2
Replace the steering oil	/	75K or 24 months			6	$ 20.44	8.0L	8.45	QT	$ 1,036.31	1.5	9.0
Replace the coolant of chassis	/	75K or 24 months			6	$ 17.99	18.0L	4.76	GAL	$ 513.79	2.0	12.0
Replace the coolant of power battery	/	75K or 24 months			6	$ 17.99	24L	6.34	GAL	$ 684.34	2.0	12.0
Brake rotor(Front)	/	200K			2	$ 293.40	2	2	PCS	$ 1,173.60	3.0	6.0
Brake rotor(Rear)	/	150K			3	$ 171.68	2	2	PCS	$ 1,030.08	6.0	18.0
Replace the brake pads	/	50K			9	$ 346.24	2	2	PCS	$ 6,232.32	3.0	27.0
Replace the 24-V battery	/	75K or 24 months			6	$ 430.53	2	2	PCS	$ 5,166.36	0.5	3.0
Replace the tire	/	50K			9	$ 663.00	6	6	PCS	$ 35,802.00	2.0	18.0
Grease the ZF front axle wheel hub bearing and wheel hub chamber.	/	For 12H series, perform inspection and maintenance every 310,000mile or 48 months.			2	$ 0.90	200g	7.05	OZ	$ 12.69	1.0	2.0
									Total Material Cost 1	$ 64,354.90	65	330.7
											Total Labor Cost 1	$ 21,495.50

Note
I=Inspect R=Replace C=Clean

Part Name	SAP	Designed Life	Replacement Times in 12 Years	Labor Hour	Total Labor Cost	Quantity Per Bus	FOB Price	Total Price(FOB USD$)
A/C Compressor	11569904-00	6	1	2	$ 520.00	4	$ 787.56	$ 3,150.24
Right Steering Gear Box	10881105-00	5	2	2	$ 260.00	1	$ 1,578.02	$ 3,156.04
Front Thrust Rod	11053471-00	10	1	1	$ 130.00	2	$ 488.35	$ 976.71
Rear Upper Thrust Rod I	11459831-00	10	1	1	$ 130.00	2	$ 122.97	$ 245.95
Rear Upper Thrust Rod II	11459852-00	10	1	1	$ 130.00	2	$ 122.97	$ 245.95
Air Compressor Assembly	12302016-00	10	1	2	$ 130.00	1	$ 6,946.36	$ 6,946.36
				Total Labor Cost 2	$ 1,300.00		Total Material Cost 2	$ 14,721.24

C10M 12 Year Cost of Ownership

BYD C10M-45 FT. 12 YEARS COST ESTIMATE

MILES PER YEAR	LABOR RATE (US$)	YEAR	TOTAL MILEAGE (MILES)	FOB TOTAL MATERIAL COST (US$)	FOR TOTAL LABOR COST(US$)	SERVICE AND MAINTENANCE COST PER MILE(US$)	ELECTRICITY RATE(KWH) (US$)	KWH/MILE	LIFE CYCLE COST (US$)	LIFE CYCLE COST PER MILE (US$)
41,667	65	12	500,000	$87,738.04	$24,557.00	$0.2246	$0.08	2.14	$197,895.04	$0.3958

Maintenance Cost

The interval depends on whichever comes first(time & mileage)					Replacement Times in 12 Years	Material Price	Qty. for Once in Metric Unit	Qty. for Once	Unit	Total Material Price	Labor Hour Per Time	Total Labor Hour
Mileage(×1,000miles)	First Maintenance <3000 Miles(first 3 months)	9	18	36								
/		Every 3 months	Every 6 months	Every 12 months								
Overall inspection	I	I	/	/	56	0	1	1	/	/	2.5	140.0
Lubricate vehicle lubricating points (non-maintenance-free and no centralized lubrication)	/	R	/	/	55	$ 0.39	300g	10.60	OZ	$ 227.37	0.5	27.5
Clean the air conditioner inlet filter	/	C	/	/	55	$ -	1	1	PCS	$ -	0.2	11.0
Clean the condenser of brake system	/	/	C	/	27	$ -	1	1	PCS	$ -	0.2	5.4
Replace the wiper blade	/	/	R	/	27	$ 20.04	2	2	PCS	$ 1,082.16	0.2	5.4
Replace the gear oil	R	/	R	/	28	$ 19.99	5.2L	1.37	GAL	$ 766.82	1.0	28.0
Replace the drive motor oil	/	/	R	/	27	$ 8.07	6.6L	6.97	QT	$ 1,518.69	0.5	13.5
Replace air dryer filter	/	/	/	R	13	$ 105.56	1	1	PCS	$ 1,372.28	0.2	2.6
Replace and check the air filter	/	/	/	R	13	$ 50.98	1	1	PCS	$ 662.74	0.1	1.3
Check and replace oil-gas separator of air compressor	/	/	/	R	13	$ 270.33	1	1	PCS	$ 3,514.29	0.2	2.6
Replace the air compressor oil	/	/	/	R	13	$ 53.17	1.45L	0.39	GAL	$ 269.59	0.3	3.9
Clean fresh air filter and condenser and evaporator filter	/	/	/	C	13	$ -	1	1	PCS	$ -	0.3	3.9
Replace the steering oil filter	/	75K or 24 months			6	$ 40.44	1	1	PCS	$ 242.64	0.2	1.2
Replace the steering oil	/	75K or 24 months			6	$ 20.44	8.0L	8.45	QT	$ 1,036.31	1.5	9.0
Replace the coolant of chassis	/	75K or 24 months			6	$ 17.99	26.0L	6.87	GAL	$ 741.55	2.0	12.0
Replace the coolant of power battery	/	75K or 24 months			6	$ 17.99	30.0L	7.93	GAL	$ 855.96	2.0	12.0
Brake rotor(Front&Tag)	/	200K			2	$ 281.64	4	4	PCS	$ 2,253.12	3.0	6.0
Brake rotor(Rear)	/	150K			3	$ 171.68	2	2	PCS	$ 1,030.08	6.0	18.0
Replace the brake pads	/	50K			9	$ 346.24	3	3	PCS	$ 9,348.48	3.0	27.0
Replace the 24-V battery	/	75K or 24 months			6	$ 342.43	2	2	PCS	$ 4,109.16	0.5	3.0
Replace the tire	/	50K			9	$ 663.00	8	8	PCS	$ 47,736.00	2.5	22.5
Grease the ZF front axle wheel hub bearing and wheel hub chamber.	/	For 12H series, perform inspection and maintenance every 310,000mile or 48 months.			2	$ 0.90	200g	7.05	OZ	$ 12.69	1.0	2.0
									Total Material Cost 1	$ 76,779.93	65	357.8
											Total Labor Cost 1	$ 23,257.00

Note
I=Inspect R=Replace C=Clean

Part Name	SAP	Designed Life	Replacement Times in 12 Years	Labor Hour	Total Labor Cost	Quantity Per Bus	FOB Price	Total Price(FOB USD$)
A/C Compressor	11439794-00	6	1	2	$ 520.00	4	$ 244.57	$ 978.28
Power Steering Gear Assembly	11640925-00	5	2	2	$ 260.00	1	$ 744.42	$ 1,488.84
Front Thrust Rod	11053471-00	10	1	1	$ 130.00	2	$ 488.35	$ 976.71
Rear Thrust Rod Ⅰ	11631177-00	10	1	1	$ 130.00	2	$ 146.78	$ 293.56
Rear Thrust Rod Ⅱ	11631176-00	10	1	1	$ 130.00	2	$ 146.60	$ 293.20
Air Compressor Assembly	K11U-3509010A	10	1	2	$ 130.00	1	$ 6,927.52	$ 6,927.52
				Total Labor Cost 2	$ 1,300.00		Total Material Cost 2	$ 10,958.11

K11M 12 Year Cost of Ownership

BYD K11M-60 FT. 12 YEARS COST ESTIMATE

MILES PER YEAR	LABOR RATE (US$)	YEAR	TOTAL MILEAGE (MILES)	FOB TOTAL MATERIAL COST (US$)	FOR TOTAL LABOR COST(US$)	SERVICE AND MAINTENANCE COST PER MILE(US$)	ELECTRICITY RATE(KWH) (US$)	KWH/MILE	LIFE CYCLE COST (US$)	LIFE CYCLE COST PER MILE (US$)
41,667	65	12	500,000	$108,034.43	$25,200.50	$0.2665	$0.08	2.77	$244,034.93	$0.4881

Maintenance Cost

The interval depends on whichever comes first(time & mileage)					Replacement Times in 12 Years	Material Price	Qty. for Once in Metric Unit	Qty. for Once	Unit	Total Material Price	Labor Hour Per Time	Total Labor Hour
Mileage(×1,000miles)	First Maintenance <3000 Miles(first 3 months)	9	18	36								
/		Every 3 months	Every 6 months	Every 12 months								
Overall inspection	I	I	/	/	56	0	1	1	/	/	2.5	140.0
Lubricate vehicle lubricating points (non-maintenance-free and no centralized lubrication)	/	R	/	/	55	$ 0.39	300g	10.60	OZ	$ 227.37	0.5	27.5
Clean the air conditioner inlet filter	/	C	/	/	55	$ -	1	1	PCS	$ -	0.2	11.0
Clean the condenser of brake system	/	/	C	/	27	$ -	1	1	PCS	$ -	0.2	5.4
Replace the wiper blade	/	/	R	/	27	$ 20.04	2	2	PCS	$ 1,082.16	0.2	5.4
Replace the gear oil	R	/	R	/	28	$ 19.99	5.2L	1.37	GAL	$ 766.82	1.0	28.0
Replace the drive motor oil	/	/	R	/	27	$ 8.07	4.6L	4.86	QT	$ 1,058.95	0.5	13.5
Replace the drive motor oil filter	/	/	R	/	27	$ 22.02	2	2	PCS	$ 1,189.08	0.2	5.4
Replace air dryer filter	/	/	/	R	13	$ 111.08	1	1	PCS	$ 1,444.09	0.2	2.6
Replace and check the air filter	/	/	/	R	13	$ 50.98	1	1	PCS	$ 662.74	0.1	1.3
Check and replace oil-gas separator of air compressor	/	/	/	R	13	$ 270.33	1	1	PCS	$ 3,514.29	0.2	2.6
Replace the air compressor oil	/	/	/	R	13	$ 53.17	1.45L	0.39	GAL	$ 269.59	0.3	3.9
Clean fresh air filter and condenser and evaporator filter	/	/	/	C	13	$ -	1	1	PCS	$ -	0.3	3.9
Replace the steering oil filter	/	75K or 24 months			6	$ 33.70	1	1	PCS	$ 202.20	0.2	1.2
Replace the steering oil	/	75K or 24 months			6	$ 20.44	8.0L	8.45	QT	$ 1,036.31	1.5	9.0
Replace the coolant of chassis	/	75K or 24 months			6	$ 17.99	26.0L	6.87	GAL	$ 741.55	2.0	12.0
Replace the coolant of power battery	/	75K or 24 months			6	$ 17.99	80.0L	21.13	GAL	$ 2,280.77	2.0	12.0
Brake rotor(Front&Tag)	/	200K			2	$ 281.64	4	4	PCS	$ 2,253.12	3.0	6.0
Brake rotor(Rear)	/	150K			3	$ 195.72	2	2	PCS	$ 1,174.32	6.0	18.0
Replace the brake pads	/	50K			9	$ 345.02	3	3	PCS	$ 9,315.54	3.0	27.0
Replace the 24-V battery	/	75K or 24 months			6	$ 430.53	2	2	PCS	$ 5,166.36	0.5	3.0
Replace the tire	/	50K			9	$ 663.00	10	10	PCS	$ 59,670.00	3.0	27.0
Grease the ZF front axle wheel hub bearing and wheel hub chamber.	/	For 12H series, perform inspection and maintenance every 310,000mile or 48 months.			2	$ 0.90	200g	7.05	OZ	$ 12.69	1.0	2.0
									Total Material Cost 1	$ 92,067.94	65	367.7
											Total Labor Cost 1	$ 23,900.50

Note
I=Inspect R=Replace C=Clean

Part Name	SAP	Designed Life	Replacement Times in 12 Years	Labor Hour	Total Labor Cost	Quantity Per Bus	FOB Price	Total Price(FOB USD$)
A/C Compressor	11569904-00	6	1	2	$ 520.00	4	$ 787.56	$ 3,150.24
Right Steering Gear Box	10881105-00	5	2	2	$ 260.00	1	$ 1,578.02	$ 3,156.04
Front Thrust Rod	11053471-00	10	1	1	$ 130.00	2	$ 488.35	$ 976.71
Rear Thrust Rod Ⅰ	11103044-00	10	1	1	$ 130.00	2	$ 147.80	$ 295.60
Rear Thrust Rod Ⅱ	11103046-00	10	1	1	$ 130.00	2	$ 176.68	$ 353.36
Air Compressor Assembly	12301995-00	10	1	2	$ 130.00	1	$ 8,034.54	$ 8,034.54
				Total Labor Cost 2	$ 1,300.00		Total Material Cost 2	$ 15,966.49

Training Cost

BYD Recommended Training Package											
No.	**Stage**	**Level**	**Classification**		**Course**	**Training location**	**Trainer**	**Target trainee**	**Number of trainee**	**Duration(h)**	**Total**
1		Basic	Operator Training		Operator Guide	Bus	BYD	Operator	5 or less	3	
2		Basic	First Responder		First Responder	Bus	BYD	Operator	5 or less	3	
3		Basic	Maintenance Training		PPE	Classroom	BYD	Technician	10 or less	1	
4		Basic	Maintenance Training	Electrical	Low Voltage Electrical System	Classroom	BYD	Technician	10 or less	6	
5		Basic	Maintenance Training	Electrical	High Voltage Electrical System Overview	Classroom/Bus	BYD	Technician	10 or less	3	
6		Basic	Maintenance Training	Charger	High Voltage Charger	Classroom/Charging Station	BYD	Technician	10 or less	4	
7		Basic	Maintenance Training	Chassis	Chassis System Overview	Classroom/Workshop	BYD	Technician	10 or less	3	
8		Basic	Maintenance Training	Chassis	Air System (Including Air Compressor)	Classroom/Workshop	BYD	Technician	10 or less	8	
9		Basic	Maintenance Training	Chassis	Brake System	Classroom/Workshop	BYD	Technician	10 or less	4	
10	**1**	Basic	Maintenance Training	Chassis	Steering System	Classroom	BYD	Technician	10 or less	1	68
11		Basic	Maintenance Training	Chassis	Cooling System (Chassis& Power Battery Cooling Systems)	Classroom	BYD	Technician	10 or less	3	
12		Basic	Maintenance Training	Chassis	Front Axle	Classroom	BYD	Technician	10 or less	2	
13		Basic	Maintenance Training	Preventive Maintenance	Preventive Maintenance	Classroom/Workshop	BYD	Technician	10 or less	8	
14		Basic	Maintenance Training	Manual Training	How to Use Service Manual	Classroom	BYD	Technician	10 or less	1	
15		Basic	Maintenance Training	Electrical	High Voltage Power Battery Introduction	Classroom/Bus	BYD	Technician	10 or less	8	
16		Basic	Maintenance Training	Electrical	High Voltage Motor Controller	Classroom	BYD	Technician	10 or less	1	
17		Basic	Maintenance Training	Electrical	High Voltage DC & Auxiliary Motor Controller	Classroom	BYD	Technician	10 or less	1	
18		Basic	Maintenance Training	Diagnostic Tools	Diagnostic Tools	Classroom/Bus	BYD	Technician	10 or less	8	
1		Advanced	Maintenance Training	Key Components	Fire Extinguisher	Classroom/Bus	BYD	Technician	10 or less	2	
2		Advanced	Maintenance Training	Key Components	Door	Classroom/Bus	BYD	Technician	10 or less	4	
3		Advanced	Maintenance Training	Key Components	Ramp	Classroom/Bus	BYD	Technician	10 or less	1	
4		Advanced	Maintenance Training	Key Components	High Voltage Air Conditioner	Classroom/Bus	BYD	Technician	10 or less	6	
5	**2**	Advanced	Maintenance Training	Key Components	High Voltage Driving System	Classroom/Workshop	BYD	Technician	10 or less	24	45
6		Advanced	Maintenance Training	Electrical	High Voltage Distribution Box	Classroom/Bus	BYD	Technician	10 or less	3	
7		Advanced	Maintenance Training	Electrical	High Voltage Charging System	Classroom	BYD	Technician	10 or less	2	
8		Advanced	Maintenance Training	Electrical	High Voltage Defroster	Classroom	BYD	Technician	10 or less	1	
9		Advanced	Maintenance Training	Electrical	Camera Surveillance System	Classroom	BYD	Technician	10 or less	1	
10		Advanced	Maintenance Training	Electrical	HAMS	Classroom	BYD	Technician	10 or less	1	
											113
										Total Price	6600

Notes: 1. BYD is providing 80 hours of BYD training which is included in base bus price.
Training modules can be selected and combined by customer.
2. Training price 200USD/h

Manual Cost and List

BYD Manuals List

#	Item	Format	Content	Unit Price	Quantity	Quantity included in bus price	Extended Price
1	Operation Manual	Hardcopy	Bus operating, charging and so on.	$ 80	3	1	$ 160
2	First Responder Manuals	Hardcopy	Emergency treatment instructions.	$ 40	0	1	$ -
3	Maintenance Manual	Hardcopy	Bus maintenance, troubleshooting, assembly and disassembly instructions and so on.	$ 200	3	1	$ 400
4	Parts Manual	Hardcopy	Bus structure, part number and so on.	$ 200	3	1	$ 400
5	Manuals set	USB	Complete manual set in PDF	$ 50	1	/	$ 50
6	Bus Electrical Schematics	Hardcopy	Bus electrical schematics separated by system	$ 75	0	1	$ -
7	Bus Pneumatic Schematics	Hardcopy	Complete bus pneumatic schematics	Included in item 6	0	1	/
					Total		**$ 1,010**

Notes: BYD is including 1 set of Operation / Maintenance / Parts Manuals / Bus Electrical Schematics / Bus Pneumatic Schematics in base bus sale price

Special Tools

BYD K9MD Special Tools List								
#	SAP	Description	Quantity	Function	Unit Price (USD)	Extended Price (USD)	Vendor	Vendor P/N
1	11869591-00	Reducer Removal Socket Tools	1	Disassemble big lock nut inside reducer, then can take out main reducer. For reducer 150J09/150J10/55J22/55J18	$351.90	$351.90	BYD	/
2	10782795-00	Can Box	1	Connect diagnose computer with bus	$980.00	$980.00	BYD	/
3	12004588-00	Special Tool For Battery Pack (For Modularization Battery Pack)	1	Move and lift battery pack, especially for chassis packs	$2,433.48	$2,433.48	BYD	/
4	/	Panasonic Thoughbook	1	KEY FEATURES Model: Prime OS: Windows 10 Pro CPU: Intel Core i5-7300U 2.60GHz Display: 14.0" HD LCD Storage: 256GB SSD Memory: 8GB Graphics: Intel Wireless: Wi-Fi, Bluetooth Optional I/O: No PC/Express Card Keyboard: Backlit Emissive Keyboard Webcam: Webcam Other: TPM 2.0	$2,500.00	$2,500.00	BYD	/

Spare Parts

BYD K9MD Parts List

#	SAP #	Part #	Part Description	Unit	Quantity Installed per Bus	Recommended Quantity	Unit Price	Extended Price	Vendor Name	Vendor P/N
1	10937110-00	K9A-5526245	32 Passenger Off Button	pcs	2	6	$ 5.86	$ 35.16	BYD	/
2	11511317-00	K9M-5526311G	Handrail Sling	pcs	15	20	$ 24.35	$ 486.90	Bentech, Inc.	SH-3H-10.81
3	11399869-00	K7M-5205312	Wiper Blade Assembly	pcs	2	34	$ 37.07	$ 1,260.34	Sprague	C-2380
4	11839554-00	K9A-3501111	Front Axle Rotor	pcs	2	6	$ 293.40	$ 1,760.40	ZF	0750.141.011
5	12342213-00	K9A-3103112	Bearing Diaphragm	pcs	2	34	$ 80.53	$ 2,737.94	ZF	0750.111.402
6	12342214-00	K9A-3103115	O-Ring 70*7	pcs	2	34	$ 3.76	$ 127.76	ZF	0634.303.844
7	12345059-00	BYDQ1892262TF3P1.5	Wheel Bolts M22*1.5	pcs	20	40	$ 7.58	$ 303.30	ZF	0736.617.031
8	12676994-00	K9-3501011	Rear Axle Rotor	pcs	2	6	$ 171.68	$ 1,030.08	BYD	/
9	11509990-00	K8SR-3501130	Rear Brake Pad	pcs	2	6	$ 137.76	$ 826.56	BYD	/
10	11243867-00	/	Brake Pad	pcs	2	34	$ 346.24	$ 11,772.16	BYD	/
11	12657761-00	K9M-3509211A	Air Compressor Air Filter Cartridge	pcs	1	17	$ 50.00	$ 850.00	Knorr	K171127K50
12	12480473-00	K9M-3509110A	Air Compressor Oil Separation Tank Maintenance Package	pcs	1	17	$ 380.16	$ 6,462.72	Knorr	K149537K50
13	12328702-00	K9M-3555210	Air Dryer Filter	pcs	1	17	$ 104.14	$ 1,770.40	Bendix	5008414PG
14	10748631-00	K9-3419100	Drag Link Left Joint	pcs	1	3	$ 27.20	$ 81.60	BYD	/
15	10748633-00	K9-3419200	Drag Link Right Joint	pcs	1	3	$ 27.20	$ 81.60	BYD	/
16	11475525-00	K9W-2906211	Front Sway Bar Round Bushing	pcs	2	6	$ 22.10	$ 132.60	BYD	/
17	11630936-00	K9F-2916211	Rear Sway Bar Round Bushing	pcs	2	6	$ 22.38	$ 134.28	BYD	/
18	10990584-00	K9-3408100	Steering Tank Filter	pcs	1	17	$ 33.70	$ 572.90	BYD	/
19	10957652-00	K9A-3526020	Parking Release Valve Assembly	pcs	1	2	$ 209.77	$ 419.54	Bendix Commercial Vehicle Sys. LLC	284727
20	10786935-00	K9A-3565010B	ASR Valve Assembly	pcs	1	2	$ 73.20	$ 146.41	Bendix Commercial Vehicle Sys. LLC	801936
21	11181981-00	K9M-3535040	Two-Way Check Valve Assembly	pcs	1	2	$ 117.45	$ 234.90	Bendix Commercial Vehicle Sys. LLC	278614N
22	12135541-00	K9MA-3518010A	Relay Valve	pcs	1	2	$ 71.96	$ 143.91	Bendix Commercial Vehicle Sys. LLC	102860
23	11339617-00	K9MA-3518020	Relay Valve	pcs	1	2	$ 74.72	$ 149.43	Bendix Commercial Vehicle Sys. LLC	K049146
24	11217356-00	K11M-3535050	Dropping Valve	pcs	1	2	$ 256.57	$ 513.14	Bendix Commercial Vehicle Sys. LLC	5015780
25	11923236-00	K9M-3816010A	Mechanical Pressure Gauge	pcs	1	2	$ 231.53	$ 463.05	Forster Instruments INC	7-743-103
26	11666869-00	K10MR-3525010	ABS Solenoid Valve	pcs	4	6	$ 94.16	$ 564.98	Bendix Commercial Vehicle Sys. LLC	K056210
27	11424054-00	BYDQ304C22-7T13F6P1.5	Front Lug Nut	pcs	20	40	$ 5.99	$ 239.40	Alcoa Wheel and Transportation	578732
28	10593895-00	BYDQ300B22T13F6	Rear Lug Nut	pcs	20	40	$ 10.43	$ 417.30	Alcoa Wheel and Transportation	578632
29	10786930-00	K9A-3526010B	Hand Brake Valve	pcs	1	2	$ 221.29	$ 442.58	Bendix Commercial Vehicle Sys. LLC	5004770
30	11188460-00	/	Fuse_170M3148-1300V-400A	pcs	2	6	$ 113.38	$ 680.28	BYD	/
31	11310345-00	/	Fuse_170M1809-1000V-125A	pcs	2	6	$ 72.76	$ 436.56	BYD	/
32	11173972-00	/	Fuse_170M1807-1000V-80A	pcs	3	9	$ 73.54	$ 661.86	BYD	/
33	11087513-00	/	Fuse_Pv-32A14L-T_32A_Φ15×90Mm_	pcs	3	9	$ 15.54	$ 139.86	BYD	/
34	11166736-00	/	Fuse_Uxp/250-200R+/-5%	pcs	1	3	$ 62.34	$ 187.02	BYD	/
35	10756906-00	/	Electric Current Sensor	pcs	2	6	$ 52.34	$ 314.04	BYD	/
36	10763625-00	/	Contactor	pcs	4	12	$ 109.36	$ 1,312.32	BYD	/
37	11213484-00	/	Relay_Evr120Ci-A_800V_120A	pcs	1	3	$ 111.50	$ 334.50	BYD	/
38	11212772-00	/	Relay_Evr300Ce-A_800V_300A	pcs	3	9	$ 144.72	$ 1,302.48	BYD	/
39	11373533-00	/	DC Leakage Sensor Assy.	pcs	1	3	$ 133.04	$ 399.12	BYD	/
40	10151497-00	/	Fuse_297005	pcs	1	3	$ 2.44	$ 7.32	BYD	/
41	10146681-00	/	Fuse_29707.5	pcs	1	3	$ 2.60	$ 7.80	BYD	/
42	10146682-00	/	Fuse_297010	pcs	1	3	$ 2.60	$ 7.80	BYD	/
43	10201082-00	/	Fuse_297015	pcs	1	3	$ 2.64	$ 7.92	BYD	/
44	10146647-00	/	Fuse_297020	pcs	1	3	$ 2.60	$ 7.80	BYD	/
45	10222378-00	/	Fuse_297030	pcs	1	3	$ 2.44	$ 7.32	BYD	/
46	10685334-00	/	Fuse3151-0001-50A	pcs	1	3	$ 3.10	$ 9.30	BYD	/
47	10348075-00	/	Fuse_3160-0001_Midi_60A	pcs	1	3	$ 3.12	$ 9.36	BYD	/
48	10348076-00	/	Fuse_3170-0001_Midi_70A	pcs	1	3	$ 3.10	$ 9.30	BYD	/
49	10348077-00	/	Fuse_3120-0001_Midi_150A	pcs	1	3	$ 3.12	$ 9.36	BYD	/
50	10146648-00	/	Fuse 297030	pcs	1	3	$ 2.60	$ 7.80	BYD	/
51	10201083-00	/	Fuse 297025_12V_25A	pcs	1	3	$ 0.40	$ 1.20	BYD	/
52	10262231-00	/	Fuse_40A	pcs	1	3	$ 2.98	$ 8.94	BYD	/
53	10310608-00	/	Fuse_50A	pcs	1	3	$ 3.10	$ 9.30	BYD	/
54	10262228-00	/	Fuse_E11121_Mini_5A	pcs	1	3	$ 2.46	$ 7.38	BYD	/
55	10551548-00	K9-3630010	ABS Electronic Control Unit	pcs	1	3	$ 511.60	$ 1,534.80	BYD	/
							Total	$ 41,582.05		

RFP #21-980369

FLORIDA ELECTRIC TRANSIT BUSES WITH CHARGING AND ASSOCIATED EQUIPMENT

PINELLAS SUNCOAST TRANSIT AUTHORITY

September 21, 2021

Build Your Dreams®

SUBMITTED BY:
BYD Coach & Bus LLC.
1800 South Figueroa Street
Los Angeles, CA 90015

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SUBMITTED TO:
Pinellas Suncoast Transit Authority
Attn: Alvin R. Burns Jr., Director of Procurement
3201 Scherer Drive
St. Petersburg, FL 33716