MAUREEN A. HARRINGTON (Cal. SBN 194606)
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San Jose, California 95113
Telephone: (408) 995-5600
Email: mharrington@greenfieldlaw.com

Attorneys for Santa Clara Valley Transportation Authority

UNITED STATES BANKRUPTCY COURT

FOR THE DISTRICT OF DELAWARE

In re	Case No. 23-11120 (BKS)
PROTERRA INC., et al.,	(Jointly administered)
Debtor.	**Hearing Date: Sept. 16, 2026 at 1:00 p.m. ET** **Obj. Deadline: Aug. 21, 2026 at 4:00 p.m. ET**

DECLARATION OF MAUREEN A. HARRINGTON IN SUPPORT OF SANTA CLARA VALLEY TRANSPORTATION AUTHORITY'S MOTION FOR LEAVE TO AMEND CLAIM NO. 1113

I, Maureen A. Harrington, declare:

1. I am an attorney licensed to practice law in the State of California and am of counsel to Greenfield LLP, attorneys for Santa Clara Valley Transportation Authority ("VTA"). The following facts are within my personal knowledge and if called upon and sworn as a witness, I could and would testify competently thereto.

2. On September 25, 2023, the above-captioned debtors ("Debtors") filed and served a "Notice of (I) Potential Assumption and Assignment of Certain Executory Contracts and Unexpired Leases and (II) Proposed Cure Amounts" [Docket #279] (the "Assumption Notice"). VTA's contracts with Debtor Proterra, Inc. were included in the "Contract Cure Schedule" attached to the Assumption Notice,

referencing both Contract No. P16265 and Contract No. P16130. The "Cure Amount" for Contract No. P16265 was scheduled as $11,571.26, and no "Cure Amount" was scheduled for Contract No. P16130. (Docket #279 at p. 44 of 55, lines 2109 to 2116.)

3. On October 16, 2023, as Docket #415, VTA filed its "Objection of Santa Clara Valley Transportation Authority to Notice of (I) Potential Assumption and Assignment of Executory Contracts and Unexpired Leases and (II) Cure Amount," a true and correct copy of which is attached hereto as **Exhibit 1** (the "VTA Objection"). The VTA Objection attached copies of both Contract No. P16265 and Contract No. P16130.

4. Attached hereto as **Exhibit 2** is a true and correct of the "Proof of Claim" filed by VTA on November 11, 2023.

5. Attached hereto as **Exhibit 3** is a true and correct copy of the email I received from counsel for the Distribution Trustee on September 2, 2025.

6. While VTA's investigation continued, the Distribution Trustee filed "The Distribution Trustee's Ninth Omnibus (Substantive) Objection to Certain (I) Misclassified and Overstated Claims, (II) Overstated Claims, and (III) Unliquidated Claims". (Docket #1608.)

7. VTA timely filed a response to the Ninth Omnibus Objection, supported by the Declaration of Naunihal Singh. (Docket #1611.)

8. VTA and the Distribution Trustee thereafter engaged in an informal exchange of information regarding VTA's claim, and the reason for the conclusion that the Proterra buses were entirely without value, and too dangerous to operate.

9. The Distribution Trustee has made no distributions to any creditors. Counsel for the Distribution Trustee advised that the Distribution Trustee intends to make a single distribution after resolution of all claims objections. To date, the Distribution Trustee has not completed that process, and no amounts due to creditors are fixed.

I declare under penalty of perjury under the laws of the State of California that

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the foregoing is true and correct to the best of my knowledge, and that this declaration was executed on August 7, 2026, at San Francisco, California.



MAUREEN A. HARRINGTON

GREENFIELD

EXHIBIT 1

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UNITED STATES BANKRUPTCY COURT

FOR THE DISTRICT OF DELAWARE

In re	Case No. 23-11120 (BKS)
PROTERRA INC., et al.,	(Jointly administered)
Debtor.	

OBJECTION OF SANTA CLARA VALLEY TRANSPORTATION AUTHORITY TO NOTICE OF (I) POTENTIAL ASSUMPTION AND ASSIGNMENT OF EXECUTORY CONTRACTS AND UNEXPIRED LEASES AND (II) CURE AMOUNT

Santa Clara County Transportation Authority ("VTA") by and through its undersigned counsel, hereby file this objection (the "Objection") to the *Notice Of (I) Potential Assumption And Assignment Of Certain Executory Contracts And Unexpired Leases And (II) Proposed Cure Amounts* [Docket No. 279] (the "Assumption Notice") filed by the above-captioned debtors and debtors-in-possession (collectively, the "Debtors"), and, in support thereof, respectfully states as follows:

1. Prior to the initiation of this case, VTA entered into two contracts with Proterra, Inc. ("Proterra") for the purchase of electric buses and charging equipment. Contract No. P16265 for the purchase of five electric buses was effective on September 20, 2017 ("Contract No. 1"). (Exhibit 1 hereto.) Contract No. P16130 was effective October 18, 2018, for the purchase of five electric buses ("Contract No. 2"). (Exhibit 2 hereto.) Contract No. 1 and Contract No. 2 are referred to together as the "Proterra Contracts").[1] Ten buses were delivered to VTA by Proterra pursuant to the Proterra Contracts.

2. As of the commencement of this case on August 7, 2023 (the "Petition Date") the Debtor scheduled the sum of $11,571.26 as an unsecured undisputed, liquidated claim due to VTA. [Docket #338 at p. 257.]

3. The ten buses delivered by Proterra have been plagued by continuing problems. While VTA had performance issues with many of the buses purchased under the Proterra Contracts, the most alarming incident occurred on September 1, 2023, when a Proterra bus caught fire while in a VTA maintenance facility (the "Bus Fire"). VTA employees pushed the burning bus out of the facility thereby avoiding damage to the structure and other vehicles, but some employees required treatment for smoke inhalation. The bus that burned was purchased under the provisions of

[1] The Proterra Contracts contain numerous additional attachments and amendments that are incorporated into its terms, all of which are in the possession of the Debtor and should therefore be considered as within the definition of the "Proterra Contracts".

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Contract No. 2, and is identified as Bus #9505.

4. VTA is informed and believes and on that basis alleges that Bus #9505 delivered by Proterra is a total loss and the damage suffered by VTA as a result of the Bus Fire is at least $880,786.98.

5. VTA has been forced to remove all the Proterra buses from service. Investigation of the specific cause of the Bus Fire is ongoing, and therefore VTA is not yet able to ascertain if all the buses provided by Proterra are impacted by the defect which caused the Bus Fire. It is therefore not presently clear if all the Proterra buses are a complete loss.

6. The Debtors listed the Proterra Contracts and additional contracts with VTA as contracts with "Proterra Operating Company, Inc." in its "NOTICE OF (I) POTENTIAL ASSUMPTION AND ASSIGNMENT OF CERTAIN EXECUTORY CONTRACTS AND UNEXPIRED LEASES AND (II) PROPOSED CURE AMOUNTS." [Docket #279 at p. 44.] However, a cure amount was provided only for Contract No. 1 [Contract No. P16265] in the amount of $11,571.25. The remaining contractual obligations between VTA and the Debtor which are sought to be assumed and assigned are scheduled with no cure amount. [Docket #279 at p. 44.]

7. Assumption and assignment of contracts requires a cure of defaults under the contract, compensation for defaults, and adequate assurance of future performance. 11 U.S.C. § 365(b)(1)(A)-(C). VTA objects to the assumption and assignment of its contracts with the Debtor, given its history of failure to provide VTA with safe, operable buses, as evidenced by, *inter alia*, the recent Bus Fire which has required that the entire fleet of Proterra buses be removed from service.

8. While VTA's total damages cannot be fully ascertained at present until it is determined if the cause of the Bus Fire renders all 10 Proterra buses inoperable, VTA is informed and believe that the actual cure amount is at least $892,358.23 [$11,571.25 (scheduled unsecured claim) + $880,786.98 (Bus Fire damage) =

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$892,358.23.]

9. It is well established that "the debtor must cure all defaults, assure future performance, and make the other contracting party whole before it may be permitted to assume the agreement." *Kimmelman v. Port Auth. of N.Y. & N.J. (In re Kiwi Int'l Air Lines, Inc.),* 344 F.3d 311, 318 (3d Cir. 2003). Here, in addition to not addressing the past defaults under its contracts with VTA, the Debtor has made no showing that it (or its assignee) can assure future performance.

10. Based upon the foregoing, VTA objects to the assumption and assignment of its contracts with the Debtor.

11. VTA reserves the right to make such other and further objections as may be appropriate or necessary, including but not limited to updating the total amount necessary to cure all defaults under the Proterra Contracts.

WHEREFORE, to the extent the Debtor seeks to assume and assign any of its contracts with VTA, it is respectfully requested that the cure amount be established as no less than $892,358.23 and that any assignee be subject to approval by VTA to assure the adequacy of future performance.

GREENFIELD LLP

Dated: October 16, 2023

By: */s/ Maureen A. Harrington*
BERNARD S. GREENFIELD
MAUREEN A. HARRINGTON
Attorneys for Santa Clara Valley Transportation Authority

Santa Clara Valley Transportation Authority

Solutions that move you

CONTRACT No. P16265

THIS CONTRACT ("Contract") is between **Proterra Inc.** (Contractor) and the **Santa Clara Valley Transportation Authority** (VTA). This Contract expresses the terms and conditions for the purchase of 5 Forty Foot Full Battery Electric Transit Buses, Charging Equipment, Spare Parts, Specialty Tooling, Training Materials, and Training Labor.

Contractor and VTA, for the consideration hereinafter named, agree as follows:

1. SCOPE OF WORK

Contractor shall furnish all necessary qualified personnel, labor, materials, tools, equipment, technical expertise, services and incidentals to furnish 5 Forty Foot Full Battery Electric Transit Buses as described in the Request for Proposal (**RFP**) **No. P16265 Forty Foot Full Battery Electric Transit Buses** Scope of Work (dated November 4, 2016) and any addenda thereto.

2. CONTRACT COMPONENTS

All of the documents listed below are deemed incorporated by reference as if fully set forth herein. The documents below constitute the entire agreement between the parties hereto and are collectively referenced as "Contract P16265."

1) This document (hereinafter "Short Form Contract") and any amendments thereto.

   a. Exhibit 1 – Price Sheet, Proterra Updated Price Proposal, dated September 13, 2017
   b. Exhibit 2 – Project Schedule, dated July 21, 2017
   c. Exhibit 3 – Key Personnel, dated March 24, 2017
   d. Exhibit 4 – Warranty Coverage Schedule, dated March 10, 2017
   e. Exhibit 5 – VTA RFP No. P16265, dated November 4, 2016
   f. Exhibit 6 – (i) RFP Addenda Numbers 1 through 3, and (ii) Questions and Answers/Pre-Offer Change Requests and Requests for Proposed Deviations or Approved Equals:

      - Addendum No. 1, dated November 29, 2016
      - Addendum No. 2, dated December 7, 2016
      - Addendum No. 3, dated September 7, 2017
      - VTA's Answers to Vendor Request for Pre-Offer Change CER 3s, submitted for RFP No. P16265 dated July 17, 2017

- VTA's Answers to Vendor Request for Pre-Offer Change CER 3s and Request for Proposal Deviation or Approved Equal to CER 6s, submitted for RFP No. P16130 dated July 17, 2017

2) Proterra Proposal, dated December 12, 2016 (not appended to the Contract, but incorporated by reference herein)

3. CONTRACT ORDER OF PRECEDENCE

In case of any conflict among these documents where the parties' intended resolution is not clear, the order of precedence shall be:

1) Short Form Contract No. P16265 and any amendments thereto

2) Price Sheet, Proterra Updated Price Proposal, dated September 13, 2017

3) Project Schedule, dated July 21, 2017

4) Warranty Coverage Schedule, dated March 10, 2017

5) VTA's Answers to Vendor Request for Pre-Offer Change – CER 3 submissions for RFP No. P16265, dated July 17, 2017

6) VTA's Answers to Vendor Request for Pre-Offer Change – CER 3 and Vendor Proposal Deviation or Approved Equal – CER 6 submissions for RFP No. P16130, dated July 17, 2017

7) Proterra Updated Proposal, dated March 17, 2017

8) Proterra's Clarification for their Updated Proposal, dated March 13, 2017

9) Proterra Updated Proposal, dated March 8, 2017

10) Proterra Proposal, dated December 12, 2016

11) RFP No. P16265 Addenda Numbers 1 through 3

12) VTA RFP No. P16265, dated November 4, 2016

13) Key Personnel, dated March 24, 2017

4. TERM OF CONTRACT

This Contract is effective as of the last date set forth by the Parties executing this Contract. The Contractor shall commence work after the effective date of the Contract. The Contract completion date shall be 15 days after the final delivery and acceptance of all Contract deliverables.

The Contract contains orders for 5 Forty Foot Full Battery Electric Transit Buses, Electric Bus Chargers, Training Aids, Training Labor, Specialty Tools, and Spare Parts. The Contract delivery date for the first bus shall be no later than January 29, 2018, and the last bus shall be no later than February 26, 2018. Exhibit 2 includes the Project Schedule for all five bus deliveries. Training Aids, Training Labor, Specialty Tools and Spare Parts are to be delivered as outlined on Exhibit 1 Price Sheet. The ChargePoint bus chargers for the 5 Electric Bus order are to be delivered no later than November 30, 2017.

5. CONTRACT PRICE

VTA shall pay Contractor a fixed price of $4,840,654.08 for 5 Forty Foot Full Battery Electric Transit Buses, Charging Equipment, Spare Parts, Specialty Tooling, Training Materials, and Training Labor, as restated in the final pricing confirmed with the July 17, 2017 email from TJ Nass: Price Sheet, dated September 13, 2017 (Exhibit 1).

6. COMPREHENSIVE BUS PARTS LIST

Contractor shall provide VTA with a comprehensive parts list in an editable Microsoft Excel format. The comprehensive parts list shall include descriptions, the Original Manufacturer Name, and Manufacturer Part Number for each part used in this bus build. Contractor must submit this comprehensive parts list with its submission of the Bus Parts Manuals, both of which are due 60 calendar days after VTA's receipt of the first production bus.

7. ENTIRE AGREEMENT

This Contract constitutes the complete and entire agreement between VTA and the Contractor and supersedes any prior representations, understandings, communications, commitments, agreements or Proposals, oral or written, which are not incorporated as a part of the Contract.

8. GOVERNING LAW

The laws of the State of California will govern these terms and conditions, as well as any claim that might arise between Contractor and VTA, without regard to conflict of law provisions.

9. FORUM SELECTION

Contractor will resolve any claim, cause of action or dispute (claim) that Contractor has with VTA arising out of or related to this Contract in a state or federal court located in Santa Clara County, California. Contractor agrees to submit to the personal jurisdiction of the courts located in Santa Clara County, California for the purpose of litigating all such claims.

10. COUNTERPARTS

This Contract may be executed in counterparts, each of which shall constitute an original, but all of which constitute one instrument.

11. AUTHORIZED REPRESENTATIVES, NOTICES AND POINTS OF CONTRACT:

The Authorized Representatives identified below, or assigned designees, have authority to authorize changes to the scope, terms and conditions of this Contract, as set forth herein.

A. AUTHORIZED REPRESENTATIVES:

Santa Clara Valley Transportation Authority
Ms. Heidi Samuels
Deputy Director
3331 N. First Street, Building A
San Jose, CA 95134-1906
heidi.samuels@vta.org

Proterra
Mr. Ryan Popple
President and CEO
1815 Rollins Road
Burlingame, CA 94010
rpopple@proterra.com

B. NOTICES: Notices shall be in writing and addressed to the Authorized Representatives at the address set forth above.

C. POINTS OF CONTACT: The Points of Contact listed below are authorized to communicate regarding contract matters, except in the case where the correspondence regarding legal notices must be addressed to the Authorized Representatives.

VTA:
Ms. Keisha Carnahan
Sr. Contract Administrator
3331 N. First Street, Building A
San Jose, CA 95134-1906
keisha.carnahan@vta.org

Mr. James Wilhelm
Sr. Mechanical Engineer
3331 N. First Street, Building B
San Jose, CA 95134-1906
james.wilhelm@vta.org

Proterra:
Mr. Ethan Carbaugh
Bid and Proposal Manager
1 Whitlee Court
Greenville, SC 29607
ecarbaugh@proterra.com

Mr. T.J. Nass
Customer Program Manager
383 Cheryl Lane
Walnut, CA 91789
tnass@proterra.com

D. WRITTEN NOTIFICATION: Written notification to the other party shall be provided, in advance, of changes in the names or addresses of the designated Authorized Representatives or Points of Contact stated above.

12. SERVICE OF NOTICE

Any notice required or permitted to be given by this Contract shall be deemed given when personally delivered to recipient thereof or mailed by registered or certified mail, return receipt requested, postage prepaid, to the appropriate recipient thereof.

In witness whereof, VTA and CONTRACTOR have executed this Contract No. P16265 as of the last date set forth below ("Effective Date").

SANTA CLARA VALLEY TRANSPORTATION AUTHORITY

Nuria I. Fernandez 9-22-17
Nuria I. Fernandez Date
General Manager/CEO

PROTERRA

9/18/17
Ryan Popple Date
President and CEO

Approved as to Form:

9/20/2017
Caroline Kim Date
Assistant Counsel



EXHIBIT 1

PRICE SHEET

PROTERRA

UPDATED PRICE PROPOSAL SCHEDULE PER TJ NASS EMAIL

DATED

SEPTEMBER 13, 2017

Updated Price Proposal Schedule – CER 1

Updated 9/13/17 & 7/17/17 per TJ Nass emails

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Price Schedule

Item #	Quantity	Item	Unit Price	Total
1.	5	40' Battery Electric Transit Bus	$ 791,850.00	$ 3,959,250.00
2.	5	Electric Bus Chargers (ChargePoint Express Plus CPE250 62.5kW Charger (Upgradable), including 3 years of ChargePoints basic level service to be delivered by November 30, 2017)	$ 40,000.00	$ 200,000.00
3.	1	Charger Installation/Validation	$_____	$_____
4.	1	Specialty Tool Package (Offered free of charge-valued at $73,162.43) VTA would like to purchase 4 additional laptops at $2,500.00 each		$ 10,000.00
5.	1	Training Aids Package (Offered free of charge-valued at $44,239.00)		$ 0.00
6.	1	Spare Parts Package (Offered free of charge-valued at $51,123.00)		$ 0.00
			Sub Total	$ 4,169,250.00
		*City of San Jose Sale Tax (use 9.25%)		$ 385,655.62

* California Sales Tax shall not be applicable to wheelchair ramp and accessories as required for the disabled, including restraints, additional barriers and flip-up seats.

7.	5	Passenger Ramps (VTA approved Ricon 621SA 6:1 Ramp w/Floating Floor or Lift-U LU18)	$ 6,900.00	$ 34,500.00
8.	5	Flip-up Seats	$ 2,328.00	$ 11,640.00
9.	5	Wheelchair Restraint Systems	$ 1,879.00	$ 9,395.00
10.	5	Additional Curbside Wheelchair Restraint Package (TS 80.5)	$_____	$_____
11.	5	Annunciator Systems	$ 5,217.69	$ 26,088.45
12.	5	Destination Sign Systems	$ 8,325.00	$ 41,625.00
13.	1	Training Labor (insert total from training labor package)		$ 150,000.00
14.	5	Delivery Costs	$ 2,500.00	$ 12,500.00
		Total shall include freight charges		
		Total Proposal Price		$ 4,840,654.08
		Cash Terms	_____% 10 days, net 30	

Updated Price Proposal Schedule – CER 1

Updated 9/13/17 & 7/17/17 per TJ Nass emails-offered the following items and quantities free of charge totaling $73,162.42; VTA will be adding 4 Laptops x $2,500.00 each, VTA to pay $10,000.00

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Specialty Tools Package (sub-list)
(Per TS 5.6.4)

Item #	Item	Qty.	Unit Price	Total
1.	Digital Multi-meter (Fluke 88V & TLK282)	1	$ 793.50	$ 793.50
2.	Digital Current Clamp (Fluke 375)	1	$ 460.00	$ 460.00
3.	4-Channel Scope (PicoScope Advanced Kit)	1	$ 2,759.00	$ 2,759.00
4.	PLC logic tester & interface	1	$ N/A	$ N/A
5.	Special ESS Diagnostics & Software	1	$ 5,052.00	$ 5,052.00
6.	ESS module stand	1	$ 1,150.00	$ 1,150.00
7.	Laptop (durabook S15AB)	5	$ 2,500.00	$ 12,500.00
8.	Battery Analyzer (Fluke BT521)	1	$ 5,175.00	$ 5,175.00
9.	Thermal Imager (Fluke Ti400)	1	$ 9,200.00	$ 9,200.00
10.	Electric Drive Diagnostics & Software	1	$ N/A	$ N/A
11.	Electric Drive adapters for overhaul	1	$ N/A	$ N/A
12.	Electric Drive Dyno Connection	1	$ N/A	$ N/A
13.	Motor Power quality analyzer (Fluke 438-II)	1	$ 10,637.50	$ 10,637.50
14.	Insulation tester (Fluke 1550C)	1	$ 5,175.00	$ 5,175.00
15.	RF spectrum analyzer (Tektronics RSA306)	1	$ 4,013.50	$ 4,013.50
16.	Brake System Diagnostics & Software	1	$ N/A	$ N/A
17.	ABS Sensor R&R Kit	1	$ 180.00	$ 180.00
18.	Disc Brake Repair Kit	1	$ 10,000.00	$ 10,000.00
19.	Differential & Propeller maintenance tools	1	$ 12,195.00	$ 12,195.00
20.	Differential overhaul tool sets	1	$ N/A	$ N/A
21.	Hub Repair Kit	1	$ 3,196.92	$ 3,196.92
22.	Pinion Seal Repair Kit	1	$ N/A	$ N/A
23.	Special steering tools/pullers	1	$ N/A	$ N/A

Updated Price Proposal Schedule – CER 1

Updated 9/13/17 & 7/17/17 per TJ Nass emails-offered the following items and quantities free of charge totaling $73,162.42; VTA will be adding 4 Laptops x $2,500.00 each, VTA to pay $10,000.00

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Specialty Tools Package (sub-list)
(Per TS 5.6.4)

Item #	Item	Qty.		Unit Price		Total
24.	Destination sign diagnostics software	1	$	N/A	$	N/A
25.	Tow adapters (if required)	3	$	225.00	$	675.00
26.	Body Dimension Analysis Tool	1	$	N/A	$	N/A
27.	Metal Analysis Tool	1	$	N/A	$	N/A
28.	Ultra Sonic Weld Analysis Tool	1	$	N/A	$	N/A
29.	Advanced Noise/Sound Analysis Tool	1	$	N/A	$	N/A
30.	Composite Structure Analysis Tool	1	$	N/A	$	N/A
	Total Specialty tools Package Cost				$	83,162.42
	Proterra offered VTA free of charge				<$	73,162.42>
	VTA Specialty Tools Package Total Due *(VTA ordered 4 additional laptops: 4 x $2,500.00=$10,000)*				$	10,000.00

All yellow highlighted Specialty Tools shall be delivered by 11/1/17; whereas, all other Specialty Tools (not highlighted) shall be delivered with the first production bus, no later than January 29, 2018. Proterra will deliver one of the laptops loaded with Proterra's diagnostic software with the Demonstration Bus delivery.

Updated Price Proposal Schedule –

Updated 9/13/17 & 7/17/17 per TJ Nass emails-offered the following Training Aids Package items and quantities free of charge

CER 1

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Training Aids Package (sub-list)
(Per TS 5.6.3)

Item #	Item	Qty		Unit Price		Total
1.	PLC Training Board	1	$	30,000.00	$	30,000.00
2.	Standalone Destination Sign System	1	$	12,239.00	$	12,239.00
3.	ESS module (without battery cells)	1	$	2,000.00	$	2,000.00
	Total Training Aids Package Cost				$	44,239.00
	Proterra offered VTA free of charge				<$	44,239.00>
	VTA Training Aids Package Total Due				$	0.00

All Training Aids shall be delivered with the leased Demonstration Bus by 10/31/17.

Updated Price Proposal Schedule –

Updated 9/13/17 & 7/17/17 per TJ Nass emails-offered the following items and quantities free of charge

CER 1

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Spare Parts Package (sub-list)
(Per TS 87)

Item #	Item	Qty.	Unit Price	Total
1.	Electric Drive System*	1	$ 38,118.00	$ 38,118.00
2.	Electric Air Compressor system	1	$ 5,715.00	$ 5,715.00
3.	Electric Hydraulic pump System	1	$ 2,795.00	$ 2,795.00
4.	Lo-Voltage Converter (DC-DC)*	1	$ 4,495.00	$ 4,495.00
	Total Spare Parts Package Cost			$ 51,123.00
	Proterra offered VTA free of charge			<$ 51,123.00>
	VTA Spare Parts Package Total Due			$ 0.00

*2 each if more than one is used on coach

All yellow highlighted Spare Parts shall be delivered by 11/1/17; whereas, all other Spare Parts (not highlighted) shall be delivered with the first production bus, no later than January 29, 2018. With that said, Proterra has committed to providing VTA any other Spare Parts as needed with the Demonstration Bus delivery.

Updated Price Proposal Schedule –

Updated 9/13/17 & 7/17/17 per TJ Nass emails

CER 1

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Training Labor (sub-list)
(Per TS 5.6)

Item #		Days		Per Day		Total
1.	Mechanics Training-orientation	1	$	Included in Base	$	Included in Base
2.	Mechanics Training-technical (Proterra stated first 5 days are free of charge)	50	$	2,000.00	$	100,000.00
3.	Mechanics Training-stand-alone classes	13	$	2,000.00	$	26,000.00
4.	Stores Training	1	$	Included in Base	$	Included in Base
5.	Operator Training	3	$	Included in Base	$	Included in Base
Item #		Class		Per Class		Total
6.	Train-the-Trainer Training	6	$	4,000.00	$	24,000.00
Item #		Sets		Per Set		Total
7.	Instructional material	9	$	Included in Base	$	Included in Base
	Total Training Labor Package Cost				$	150,000.00

Proterra has committed to providing the following training with the delivery of the Demonstration Bus on October 31, 2017:

- **Operator Training – 2 Days (4 Classes of 4 hours each for 20 students total)**
- **Maintenance Training – 3 Days (1 Class for 5-6 Technicians)**

The rest of the Training shall be delivered with the first production bus no later than January 29, 2018, unless VTA and Proterra mutually agree to a different Training Schedule.

Updated Price Proposal Schedule –

Updated 9/13/17 & 7/17/17 per TJ Nass emails

CER 1

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Proposer _____

By Ryan Popple, President & CEO Date 9/18/17

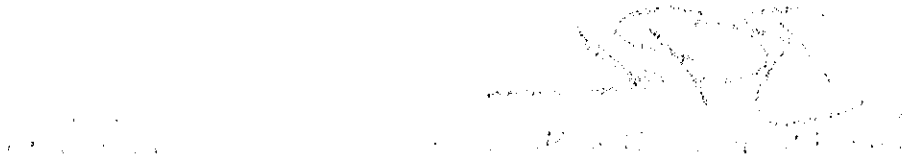


EXHIBIT 2

PROJECT SCHEDULE

DATED

JULY 21, 2017

EXHIBIT 2
PROJECT SCHEDULE
DATED JULY 21, 2017

SANTA CLARA VTA/PROTERRA LOW-NO BUS PRODUCTION AND DELIVERY SCHEDULE													
Project	Bus	T	Station 0	Station 1	Station 2	Station 3	Station 4	Station 5	Station 6	Comm	Paint	Shipping	Arrival at VTA
SCVTA	VTA 1	Plan Start	10/31/2017	11/7/2017	11/14/2017	11/21/2017	11/30/2017	12/7/2017	12/14/2017	12/21/2017	1/4/2018	Friday, January 26, 2018	Saturday, January 27, 2018
		Plan Finish	11/6/2017	11/13/2017	11/20/2017	11/29/2017	12/6/2017	12/13/2017	12/20/2017	1/3/2018	1/23/2018	Saturday, January 27, 2018	**Monday, January 29, 2018**
SCVTA	VTA 2	Plan Start	11/7/2017	11/14/2017	11/21/2017	11/30/2017	12/7/2017	12/14/2017	12/21/2017	1/4/2018	1/11/2018	Friday, February 02, 2018	Saturday, February 03, 2018
		Plan Finish	11/13/2017	11/20/2017	11/29/2017	12/6/2017	12/13/2017	12/20/2017	1/3/2018	1/10/2018	1/30/2018	Saturday, February 03, 2018	**Monday, February 5, 2018**
SCVTA	VTA 3	Plan Start	11/14/2017	11/21/2017	11/30/2017	12/7/2017	12/14/2017	12/21/2017	1/4/2018	1/11/2018	1/18/2018	Friday, February 09, 2018	Saturday, February 10, 2018
		Plan Finish	11/20/2017	11/29/2017	12/6/2017	12/13/2017	12/20/2017	1/3/2018	1/10/2018	1/17/2018	2/6/2018	Saturday, February 10, 2018	**Monday, February 12, 2018**
SCVTA	VTA 4	Plan Start	11/21/2017	11/30/2017	12/7/2017	12/14/2017	12/21/2017	1/4/2018	1/11/2018	1/18/2018	1/25/2018	Friday, February 16, 2018	Saturday, February 17, 2018
		Plan Finish	11/29/2017	12/6/2017	12/13/2017	12/20/2017	1/3/2018	1/10/2018	1/17/2018	1/24/2018	2/13/2018	Saturday, February 17, 2018	**Monday, February 19, 2018**
SCVTA	VTA 5	Plan Start	11/30/2017	12/7/2017	12/14/2017	12/21/2017	1/4/2018	1/11/2018	1/18/2018	1/25/2018	2/1/2018	Friday, February 23, 2018	Saturday, February 24, 2018
		Plan Finish	12/6/2017	12/13/2017	12/20/2017	1/3/2018	1/10/2018	1/17/2018	1/24/2018	1/31/2018	2/20/2018	Saturday, February 24, 2018	**Monday, February 26, 2018**

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EXHIBIT 3

KEY PERSONNEL

DATED

MARCH 24, 2017

EXHIBIT 3

Key Personnel

March 24, 2017

Proterra's Key Personnel Roles for the Forty Foot Full Battery Electric Bus Build (Request for Proposal# P16265) are as follows:

- Regional Sales Manager
  Lee Wixom
  Regional Sales Director
  383 Cheryl Lane
  City of Industry, CA 91789
  lwixom@proterra.com

- Customer Programs Manager
  TJ Nass
  CPM
  383 Cheryl Lane
  City of Industry, CA 91789
  tnass@proterra.com

- Product Support Manager (Service)
  Mike Finnern
  Director – Customer Service
  1 Whitlee Court
  Greenville, SC 29607
  mfinnern@proterra.com

- Quality Assurance Advance Product Coordinator
  Tony Dempsey
  Director – Quality Assurance
  1 Whitlee Court
  Greenville, SC 29607
  tdempsey@proterra.com

  * Note – Proterra is still in the hiring phase for the Quality Manager for the LA facility. Tony's team is supporting the factory until the hire is made.

EXHIBIT 3

Key Personnel

- Service Training Manager
  Josh Burnidge
  Training Manager
  1 Whitlee Court
  Greenville, SC 29607
  jburnidge@proterra.com

- Product Training
  Josh Burnidge
  Training Manager
  1 Whitlee Court
  Greenville, SC 29607
  jburnidge@proterra.com

- Proterra Parts Support -General Contact #
  Customer Service
  1 Whitlee Court
  Greenville, SC 29607
  864-438-0000
  serviceparts@proterra.com

- Proterra Parts Support-Individual Contact #
  Mary Caroline Kreps
  Service Buyer/Planner
  1 Whitlee Court
  Greenville, SC 29607
  864-214-2689
  mckreps@proterra.com

EXHIBIT 4

WARRANTY COVERAGE SCHEDULE

DATED

MARCH 10, 2017

CER 11: WARRANTY SCHEDULE

SANTA CLARA Valley Transportation Authority

40' Low Floor Full Battery Electric Transit Bus
BUS WARRANTY COVERAGE SCHEDULE
RFP: #P16205

SYSTEM/SUBSYSTEM COMPONENTS	YEARS	MILEAGE	Manufacturer	Warranty Administrator During Complete Bus (Bumper to Bumper) First 2 Years	Warranty Administrator After 2 Years
Complete Bus (Bumper to Bumper)	2 years	100,000 miles	Proterra	Proterra Service	Proterra Service
Battery (Low Voltage)	2 years	100,000	X2 Power	Proterra Service	Proterra Service
Charging System	3 years	N/A	ChargePoint	Proterra Service	Proterra Service
LED LAVP ASSEMBLIES	2 years	100,000	Proterra	Proterra Service	Proterra Service
Structural Integrity Corrosion Perforation - Class 1 or Class 2 Failure	12 years	500,000 miles	Proterra	Proterra Service	Proterra Service
Body/Chassis/Suspension Structure	3 years	150,000	Proterra	Proterra Service	Proterra Service
Electric Cooling system	5 years	300,000 miles	Proterra	Proterra Service	Proterra Service
HYBRID/ELECTRIC DRIVE SYSTEM	**YEARS**	**MILEAGE**			
Electric Drive Unit	6 years	300,000 miles	Proterra	Proterra Service	Proterra Service
Electric Drive Power Inverter	6 years	300,000 miles	Proterra	Proterra Service	Proterra Service
Energy Storage System (ESS)	6 years	300,000 miles	Proterra	Proterra Service	Proterra Service
Transmission Control Module (TCM)/Drive System Controller	6 years	300,000 miles	Proterra	Proterra Service	Proterra Service
Vehicle Control Module (VCM)	6 years	300,000 miles	Proterra	Proterra Service	Proterra Service
Push Button Shift Selector	2 years	100,000 miles	Proterra	Proterra Service	Proterra Service
DC-DC Converter (High Voltage to 24V)	2 years	100,000 miles	TDI Power	Proterra Service	Proterra Service
High Voltage Power Distribution Module	6 years	300,000 miles	Proterra	Proterra Service	Proterra Service
Air Compressor Electric Drive System & Control	3 years	150,000 miles	Hydrocarb	Proterra Service	Proterra Service
Hydraulic Pump Electric Drive System & Control	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
BRAKE/ABS SYSTEM (Including Slack Arm & Brake Chamber)					
Chambers	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
Slack Adjusters	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
Spider Arm	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
Camshafts	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
Hub Cap Ass	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
Ring ASS	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
Destination Signs/Control System					
Controller Assembly	12 years, years 1-6 parts and labor / years 7-12 parts only	Unlimited Miles	I/O Controls	Proterra Service	I/O Controls
Digital Recorder Box	12 years, years 1-6 parts and labor / years 7-12 parts only	Unlimited Miles	I/O Controls	Proterra Service	I/O Controls
Control Console	12 years, years 1-6 parts and labor / years 7-12 parts only	Unlimited Miles	I/O Controls	Proterra Service	I/O Controls
Heating Air Conditioning System (HVAC)					
A/C Compressor	3 years	150,000 miles	Eberspacher	Proterra Service	Proterra Service
Condenser/Motors	3 years	150,000 miles	Eberspacher	Proterra Service	Proterra Service
Drive Belt	3 years	150,000 miles	Eberspacher	Proterra Service	Proterra Service
High Voltage Drive System & Controller	3 years	150,000 miles	Eberspacher	Proterra Service	Proterra Service
Blowers/fans	3 years	150,000 miles	Eberspacher	Proterra Service	Proterra Service
OTHER MISC SYSTEMS/COMPONENTS	**YEARS**	**MILEAGE**			
Door Assembly Systems (Front/Rear)	3 years	150,000 miles	Ventura	Ventura	Ventura
Video Surveillance System	3 years	100,000 miles	Safety Vision	Proterra Service	Proterra Service
Wheelchair Ramp System	3 years	150,000 miles	Ricon	Proterra Service	Proterra Service
Radiator Assembly	3 years	100,000 miles	Proterra	Proterra Service	Proterra Service
Steering (Gear) Assembly	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
Power Steering Pump	3 years	150,000 miles	Proterra	Proterra Service	Proterra Service
Suspension (Air Bags/Shocks Rods) System	3 years	150,000 miles	ZF	Proterra Service	Proterra Service
Drive Axle/Differential/Drive Shaft	3 years	300,000 miles	ZF	Proterra Service	Proterra Service
Driver's Seat Assembly (Cushions)	3 years	100,000 miles	USSC	Proterra Service	Proterra Service
Passenger Seat Assembly (Cushions)	3 years	100,000 miles	American Seating	Proterra Service	Proterra Service
Wheelchair Restraint System	3 years	150,000 miles	American Seating	Proterra Service	Proterra Service

EXHIBIT 5

REQUEST FOR PROPOSAL

(RFP) P16265

DATED

NOVEMBER 4, 2016

Request for Proposal

Proterra and VTA
2015 LoNo Grant Partnership

Santa Clara Valley Transportation Authority

Valley Transportation Authority

PROTERRA 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES



P16265

Sr. Contracts Administrator	Keisha Carnahan
Key RFP Dates	
Date Issued:	NOVEMBER 4, 2016
Pre-Proposal Conference:	NOVEMBER 14, 2016; 10:00 AM P.T.
Submit Questions:	NOVEMBER 21, 2016 by 5:00 PM P.T.
Submit Proposal:	NOVEMBER 30, 2016 by 2:00 PM P.T.

REQUEST FOR PROPOSAL
#P16265

40' FULL BATTERY ELECTRIC TRANSIT BUSES

COVER LETTER

Attn: Proposer ---- Solicitation # P16265

Subject: Procurement is subject to the availability of funding

Reference: RFP Solicitation #P16265
40' Full Battery Electric Transit Buses

This letter serves as notice that this procurement is subject to the availability of funds.

VTA's obligation hereunder is contingent upon the availability of appropriated funds from which payment for the Contract purposes can be made. No legal liability on the part of VTA for any payment will arise until funds are made available for this Contract and until the Contractor receives notice of such availability, to be confirmed in writing by the Contract Administrator. Any award of Contract hereunder will also be conditioned upon said availability of funds for the Contract.

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SECTION 1: NOTICE OF REQUEST FOR PROPOSAL

NR 1. Description of the Work to be Done

VTA requests a Proposal for the manufacture and delivery of five (5) 40 Foot Low Floor Full Battery Electric transit buses with spare parts for delivery no later than December 20, 2017 in accordance with the terms and conditions set forth below ("Work"). The resulting contract ("Contract") shall be a firm-fixed price contract). A pilot build of one (1) bus shall be completed one-hundred fifty (150) days prior to the beginning of the rest of the bus build, in accordance with the Technical Specifications.

Specifically, VTA is requesting the following types of buses: 40 Foot Low Floor Full Battery Electric Buses.

NR 2. Identification of Funding Sources

Financial support of this project may be provided through financial assistance of grants from the Federal Transit Administration (FTA) and the State of California, as well as local VTA funds depending on fund availability. This Contract may become subject to financial assistance agreements between VTA and the U.S. Department of Transportation. If so, then all Federal requirements will apply. This procurement is a partnership with Proterra utilizing the Low or No Emission Vehicle Deployment Program (LoNo) Grant.

NR 3. Proposal Due Date and Submittal Requirements

Proposal must be received by 2:00 PM PT, Wednesday, November 30, 2016.

1. Sealed Proposal shall be submitted to the following addresses:
   a. For U.S mail, courier delivery or hand delivery:
      Keisha Carnahan, Sr. Contracts Administrator
      3331 N. First Street, Building A-PCMM
      San Jose, CA 95134-1927

2. Envelopes or boxes containing Proposal shall be sealed and clearly labeled with VTA's Proposal number and the solicitation title: RFP #P16265; 40 Foot Low Floor Full Battery Electric Buses

3. Proposer is requested to submit to VTA one (1) hard copy marked "Original," five (5) additional printed copies, and one (1) CD or flash drive , containing an electronic PDF copy of the Proposal. In the case of any discrepancies between the hard copy and the electronic version, the hard copy shall govern, as the hard copy is what will be considered by VTA in evaluating the Proposal, and the electronic version is provided for VTA's administrative convenience only. A Proposal is deemed to be late if it is received by VTA after the deadline stated above. A Proposal received after the submission deadline may be rejected.

NR 4. Validity of Proposal

The Proposal and subsequent offers shall be valid for a period of two hundred seventy (270) days from the proposal due date. All labor, equipment, and materials shall be furnished in strict accordance with the delivery schedule and conditions of the Contract Documents.

SECTION 2: INSTRUCTIONS TO PROPOSER

IP 1. Quantities

The Work under these Contract documents consists of the manufacture and delivery of a base order of five (5) 40 Foot Full Battery Electric transit buses and associated goods and services, as described in this RFP, to be delivered no later than December 20, 2017 in accordance with the terms and conditions as set forth below.

IP 2. Proposed Schedule for the Procurement

The following is the solicitation schedule for Proposer:

- Proposer communications and requests: NOVEMBER 21, 2016 by 5:00 PM PT
- Proposal Due Date: November 30, 2016, 2:00 PM PT

IP 3. Proposal Security Requirements (Performance Bond)

PROPOSAL GUARANTEE BOND: Each proposal shall be accompanied by a certified or cashier's check, cash, or a bond, from a surety licensed to do business in the State of California, in the sum of not less than 5% of the Total Base Price. Said checks or bond shall be made payable to the order of the Santa Clara Valley Transportation Authority. A letter from surety shall be provided stipulating that the Proposer can also obtain the required performance bond. No pricing information shall be provided in this letter.

Please see the Offer Guarantee Bond form (CER 9.4) within this solicitation and return the completed form with your proposal.

If the proposal is not accepted by VTA, or if the Proposer to whom the contract is awarded executes and delivers to VTA the required Contract Forms, then the amount of the cash or the certified or cashier's check shall be returned to the Proposer.

PERFORMANCE BOND: The Contractor shall furnish, at its own expense, performance security, in the form of a cashier's check or letter of credit in a form approved by VTA, or shall furnish a performance bond, from a surety authorized to do business in the state of California as an admitted surety insurer, in the amount of ten percent (10%) of the full amount of the Contract, which will be for the base order of 5 buses initially. Should VTA exercise the option to purchase up to 25 additional buses, then Contractor shall furnish the Performance Bond in the amount of 10% of the full amount of the option buses. The bond shall cover all of Contractor's obligations under the Contract, except for the warranty and shall remain in force until all of the required number of buses are delivered and accepted.

PAYMENT BOND: The Proposer shall obtain a payment bond in the amount of 10% of the full amount of the Contract, which will be for the base order of 5 buses initially. The payment bond shall provide security to all persons who, by contract or otherwise, furnish labor or materials to be incorporated in the project. The bond shall be in a form, and issued by a surety, acceptable to VTA. The surety company, as a minimum, shall comply with U.S. Department of Treasury Circular C570 and be authorized to do business in State of California.

WARRANTY BOND: Contractor shall provide a four (4) year warranty or guaranty bond in the amount of ten percent (10%) of the full amount of the Contract, which will be for the base order of buses initially, covering all of Contractor's warranty obligations under the Contract, which bond shall become effective upon release of the performance bond required above.

In the case that a surety shall become insolvent or its authorization to do business in the state of California as an admitted surety is revoked or suspended, the Contractor, within five (5) days after notice by VTA, shall substitute other and sufficient surety or sureties. If the Contractor fails to do so, such failure shall constitute grounds for termination for default, in accordance with Section GC 9.4.2.

Upon award of the Contract to a Proposer, such Proposer shall commence performance under the Contract by executing all Contract Guaranty Agreements provided with the Proposal, 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 twenty (20) calendar days after the date of receipt of the notice of award or within such further time as VTA may allow. Failure to fulfill these requirements within the specified time is cause for termination of the Contract under "Termination for Default" (Section GC 9.4.2).

IP 4. Questions, Clarifications and Omissions

All correspondence, communication, and contact in regard to any aspect of this solicitation or offers shall only be made with the Contract Administrator (or their designated representatives) and any additional person listed. Unless otherwise instructed by the Contract Administrator or any additional person listed, Proposer and their representatives shall not make any contact with or communicate with any member of VTA, or its employees and consultants, other than the designated Contract Administrator or their designated representatives and any additional person listed, 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," Proposer 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. Any request for a change to any requirement of the Contract documents must be fully supported by 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. Prior to proposal due date, Proposer should confine requested changes to the RFP's terms and conditions, scheduling requests, and to those items that are most critical to their planned Proposal. Each of these requests shall be submitted on the Request for Pre-Offer Change Form. Requests for the Pre-Offer Change Form must be received by the Question Submission deadline of 5:00 PM PT on November 21, 2016.

Requests for suggested substitutes of specified items shall be submitted using the Form for Proposal Deviation or Approved Equal. Please note that for any brand names that are used in this solicitation shall mean the brand name or approved equal. To reduce repetition in the Scope, note the following: In all cases of approved equals proposed, a documented history of acceptable post-delivery customer support is a requirement. The Proposer making the request shall be responsible for its proper delivery to VTA, as identified on the Form for Proposal Deviation or Approved Equal. Requests for Proposal Deviation or Approved Equal submissions must be sent to the attention of the Contract Administrator and received by the Proposal submission deadline.

VTA shall provide approvals to alternative equal submissions through an addenda. Any VTA response that is not confirmed by a written addendum shall not be official or binding on VTA.

When submitting the Request for Pre-Offer Change and the Proposal Deviation or Approved Equal forms, VTA expects that some requests will have follow up questions to VTA's response. In order to best facilitate and document the exchange between the Proposer and VTA, VTA requires that the Proposer submit the form both in hard copy and an electronically editable soft copy. Both soft and

hard copies are to be identical. In the case of a mismatch between the two, VTA shall have sole discretion in determining which to answer. The soft copy shall be either in an unlocked Microsoft Word or Adobe Acrobat format with editable form text boxes, where applicable. Each requested entry by the Proposer must be dated. VTA's responses will be dated and provided electronically on the same request form. Should the Proposer have follow up questions, Proposer must use the original request form to ask for additional clarification. The original request may not be altered. Should VTA find that any of the original text has been edited upon submission of the follow up question, the request as a whole may be rejected.

If it should appear to a prospective Proposer that the performance of the Work under the Contract, or any of the matters relating thereto, are not sufficiently described or explained in the RFP or Contract documents, or that any conflict or discrepancy exists between different parts of the Contract or with any federal, state, local, or agency law, ordinance, rule, regulation or other standard or requirement, then the Proposer shall submit to VTA a written request for clarification by the Question submission deadline specified above.

IP 5. Addenda to RFP

VTA reserves the right to amend the RFP at any time. Any amendments to or modifications of the RFP shall made by written addenda. Any addenda will be sent directly to the vendor as an email attachment. Failure of any prospective Proposer to receive the notification or addendum shall not relieve the Proposer from any obligation under its Proposal, as submitted, or under the RFP, as clarified, interpreted or modified. All addenda issued shall become part of the RFP. Prospective Proposer shall acknowledge the receipt of each individual addendum and all prior addenda in their Proposal. Failure to acknowledge in their Proposal receipt of addenda may, at VTA's sole discretion, disqualify the Proposal. If any addenda are issued after Proposal are due, VTA asks that the vendors resubmit CER 4. Acknowledgement of Addenda Form with their final BAFO submittal.

If VTA determines that the addenda may require significant changes in the preparation of Proposal/BAFOs, the deadline for submitting the Proposal/BAFOs may be postponed by the number of days that VTA determines will allow Proposer sufficient time to revise their Proposal/BAFOs. An extension to the Proposal 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 Transportation Administration (FTA) an approved or not disapproved annual disadvantaged business enterprise (DBE) subcontracting participation goal. The Proposer must be listed in FTA's Transit Vehicle Manufacturers at http://www.fta.dot.gov/civilrights/12891.html at time of Proposal due date.

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 Proposer's attention is directed to 49 CFR § 661.11, "Rolling Stock Procurements"; Section 3011 of the FAST Act; and Federal Register Vol. 81 No. 170 (Published September 1, 2016), which increases the domestic content requirements for rolling stock, effective as of October 15, 2015. Prospective

Proposer has the responsibility to comply with the cited and any governing statutes and regulations, including official interpretations.

A Proposer shall submit to VTA the appropriate Buy America certification, included in this document, with all offers on FTA-funded contracts. A Proposal that is not accompanied by a properly completed Buy America certification is 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. Proposer 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 shall simultaneously send a copy of this information to VTA.

The FTA Chief Counsel may request additional information from the Proposer, if necessary. VTA 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.

Prior to contract award, if VTA has determined in its sole discretion that there is a need for a waiver, a waiver from the Buy America provisions will be sought by VTA from the FTA for the proposed awardee. A Proposer seeking a waiver must submit to VTA 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 VTA 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

The Proposer is 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 or Approved Equal, setting forth, at a minimum, the specific reasons for each deviation so that it can be fully considered and, if appropriate, evaluated by VTA. 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 or Approved Equal is included in the Technical package. Failure to properly use the Form for Proposal Deviation or Approved Equal may result in VTA's rejection of the deviation submission.

IP 8.1 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 within five (5) days of receiving VTA's final determination. FTA review is limited to the alleged failure of VTA to have written protest procedures, the alleged failure of VTA to follow those procedures, the alleged failure of VTA to review a protest, or the alleged violation of federal law or regulation.

IP 9. Preparation of Proposal

IP 9.1 Use of Proposal Forms

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

IP 9.2 Alternate and Multiple Proposal (Reserved)

Section not used.

IP 9.3 Proposal Format Requirements

The Proposal shall be submitted in four (4) separately sealed packages identified below. Each package shall be marked as specified below and shall contain all the Proposal documents for which the package is required to be marked and shall include no other documents. These same requirements shall apply to any best and final offers (BAFOs) that may be requested.

The Proposer shall submit each packet with one (1) original (marked clearly as such), five (5) hard copies, and one (1) CD or flash drive, containing an electronic PDF copy of the Proposal to VTA. There shall be 4 packets: Technical Proposal, Price Proposal, Contract Administration/Qualifications, and Proprietary/Confidential Information. In case of any discrepancies, the original will be considered by VTA in evaluating the Proposal, and the electronic version is provided for VTA's administrative convenience only. All submitted electronic copies are to be completely text searchable files. Both electronic and hard copy documents must be clearly marked with their most recent revision date.

The hard-copy Proposal shall be prepared double-sided on 8½ × 11 in. paper in at least 11-point font. The hard copies shall be contained in three-ring binders, the contents of which are identified on the outside. Use of 11 × 17 in. foldout sheets for large tables, charts or diagrams is permissible, but should be limited. Elaborate formatting is not necessary. Do not provide promotional or advertising information, unless this information is requested and/or is necessary to support the technical submittal.

Any additional information requests are to be submitted both in hard and electronic formats, as described above.

No cost, price or financial information of any kind shall be included in Packages No. 1, 3 or 4 or in any of the proposal documents that are contained therein.

Any proprietary information, trade secrets, or confidential commercial and financial information, which a Proposer believes should be exempt from disclosure, shall be submitted in a separate volume (Package No. 4) as indicated in Package 4 requirements.

Proposal packages shall be addressed and delivered to the address specified in "Proposal Due Date & Submission Requirements."

TECHNICAL PROPOSAL REQUIREMENTS

A. General

The technical proposal shall enable VTA evaluating personnel to arrive at a sound determination as to whether or not the proposed vehicles will meet the requirements of VTA. To this end, the technical proposal shall be sufficiently specific, detailed, and complete as to clearly and fully demonstrate that the Proposer has a thorough knowledge and understanding of the requirements and has valid and practical solutions for technical problems. Concise text, graphs, tables and drawings should be included, as needed, to clearly describe the equipment and performance. Statements which paraphrase the specifications or attest that standard procedures will be employed are inadequate to demonstrate how the Proposal will comply with the specified requirements. VTA seeks a Contract which provides the best solution for the procurement yet allows the Contractor flexibility in providing a cost-effective solution. Accordingly, VTA expects Proposer to include their own solutions in proposed designs, as appropriate.

The technical proposal shall be a technical description of the proposed vehicle subsystems, system support, and of the management approach for completing the work. It shall incorporate, on a section-by-section basis, sufficient information to permit a thorough understanding of the proposed vehicle and systems, without the need for any additional information or discussion. Key design data shall be provided on the General Coach Data Sheet (CER 10) and included with the proposal. If offer includes alternate Contractors for subsystems, then sufficient information shall be provided for each alternate. All drawings required to adequately describe the vehicle design elements being offered shall be of sufficient quality and detail to enable a meaningful evaluation. The drawings shall be bound in the proposal, and those larger than 8.5" x 11" shall be properly folded. Drawings may be half-size or reduced-size provided that clarity and legibility is maintained.

B. Organization

The technical proposal shall consist of numbered sections, clearly separated from each other by index tabs. The title and number used to identify each section shall be consistent with the sections of the Technical

Specification identified below. Each technical proposal section shall be complete and self-contained so that the reviewer can obtain a thorough understanding of the solution(s) being offered to meet the requirements of the associated Specifications section. All drawings, schematics, tables, or other pre-packaged technical documentation shall be included as enclosures or appendices to the proposal section to which they pertain. The following items of information shall be included in Sections 3 through 15 of the technical proposal, to the extent they are applicable:

i. A complete description of the system and equipment being offered.
ii. Brand names and/or subcontractor identity for major systems and/or equipment.
iii. Evidence of in-service performance (duration, type of service, where/transit property and performance record). Provide the manufacturer's data sheets, specifications and number of units in service elsewhere. Include contact points and telephone numbers of individuals at properties where the equipment has been in service.
iv. Diagnostic capabilities integral to the equipment. Include the type of records, and their accessibility and a description of how the diagnostics minimize fault finding and the mean time to repair (MTTR).
v. Estimated routine maintenance requirements and intervals.
vi. Design status as it relates to solutions requiring design and development of any new equipment required to meet VTA specifications.
vii. Proposer may propose alternatives for suppliers of subsystems.
viii. Verification that the offered solution is fully compliant with the Specification. The Proposer may include alternative solutions, which may deviate from the Specified requirements. However, should the Proposer elect to include solutions which are believed to be advantageous to VTA but which are not in full compliance with the Specification they shall be clearly identified and included using the "Form for Proposal Deviation or Approved Equal" (CER 6). The Proposer shall include in this form all applicable items in "i" through "vi" above, plus a clear explanation of and supporting documentation on the advantages and acceptability of the alternative for the intended service, and the specific changes to the Specification required to make the alternative compliant. If the Proposer proposes the use of an alternative technical standard in place of the standard specified in the Technical Specification, then in addition to the above requirements, Proposer shall also provide a copy of the proposed standard in the English Language. (Any price benefits associated with each proposed deviation shall also be identified on the deviation form and submitted in the Price Proposal.) Any deviations accepted by VTA will be published as an addenda so that the Proposer shall be given the opportunity to submit an amended Proposal, if necessary.
ix. Table of Contents, at the beginning of the section, listing major subdivisions of the technical presentation, all enclosures and other attachments comprising the individual and separate sections.

C. Individual Section Requirements

The information required will be used by VTA's evaluating personnel. Additional information may be required during the evaluation and the negotiation phases of the contract in order to determine the Proposer's compliance with all of the technical specifications.

The particular information to be included in each of the sections of the technical proposal is described in the following paragraphs. Each of the following paragraphs addresses information requirements peculiar to the individual section. Note that the Technical Proposal submittal requirements do not necessarily include the Contract Design submittal requirements listed in each of the sections of the Technical Specification. The general requirements in Section A above pertain to all sections to the degree that they are applicable. Failure

to completely and properly include all information could result in rejection of the Proposer's proposal as non-responsive.

I. **Section 1 – General Information and Qualifications**
This section shall include a general introduction to the Proposer's experience and capability and the vehicle proposed. In addition, the General Coach Data Sheets and charging infrastructure specifications shall be completed and included with the Technical Proposal.

II. **Section 2 – Systems Requirements**
Specific items to be addressed include:
2.5 Vehicle Technical Information (RFP, CER 10) Complete, and properly filled out.
2.5.6.1a Training - Detailed breakdown of training program/classes as requested by VTA in the RFP.
2.5.6.1b Tools - Listing all tools requested by VTA that can be provided. A second list of all supplier recommended specialty tools.
2.5.9.1 Interior Noise & Vibration - Provide actual noise measurement and generated structure vibration data for similar vehicle types. Include the articulation sections.
2.5.9.2 Exterior Noise - Provide actual noise measurement for similar vehicle types.
2.5.9.3 Electrical Noise Control Requirements - Describe the process that will be used to ensure compliance with listed standards. The approach taken to minimize EMI/RFI risk shall also be listed.
2.5.9.4 Electrical Noise Test Data (HV System) Provide EMF testing data for passenger compartment. Data to be collected throughout the passenger space. Should include specific location near high voltage (HV) transmission lines and components. Data to include frequency and intensity information.
2.5.10.1 Detailed description and technical/engineering drawings showing fire detection system.
2.5.11.1 System Selection Proper nozzle placement, and system selection

III. **Section 3 – Propulsion**
Specific items to be addressed include:
3.7 Performance Requirements - Analysis showing the performance of the vehicle, covering acceleration, deceleration, maximum speed, continuous speed, turn radius, and operating range. Provide a graphic presentation.
3.7.1 Description of the proposed Diagnostic system and special test equipment. A detailed discussion of the functions being provided and the operation of the equipment is essential. This should include specialty systems such as the electric fans, hydraulic, or air systems.
3.8 Energy Economy Requirements - Detailed engineering analysis with modeling and real world data where applicable showing that the vehicle meets the required range on the operating profile and conditions given in the RFP.
3.9 Provide the specific drive unit data sheet to be used on the vehicle.
3.10 Identification of the specific cooling system and other components relative to the propulsion system and the cooling capability. Include identification of the fans, motors, and radiator/charge air manufacturers, along with documentation of component reliability performance.
3.12 Regenerative Braking System Performance Data
3.14 Hydraulic System - To include principles of operation and technical schematics. This section should also include any applicable hydraulic drive, pump, and motor information.

IV. Section 4 – Power Electronics Package

This section shall describe the proposed high voltage power systems

Specific items to be addressed include:

4.9.3a Description & schematics of the high voltage ground fault detection system.

4.9.3b Description of the Energy storage system, detailed down to the individual battery cell level.

4.a Description, schematics, & logic tree operation of the battery monitoring system.

4.b Description & schematics of all high voltage subsystems, examples include air compressor & HVAC systems.

V. Section 5 – Charging Infrastructure

Specific items to be addressed include:

5.18 Provide detailed technical specifications for all charger models offered, including the optional in route systems. Shall include engineering drawings, electrical schematics, and operations manuals.

5.18.2a Provide a complete charging infrastructure installation plan. This shall include detailed timeline for the design, construction, & acceptance of the proposed charging stations at VTA's designated facility.

5.18.2b Provide supporting information about their proposed charging station.

VI. Section 6 – Body Structure

Specific items to be addressed include:

6.20 A description of the Bus body structural features incorporated to ensure the crash-worthiness of the design. An explanation of the Contractor's methodology applied to meeting the crash-worthiness criteria of the Specification and the crash test results.

6.20.1 A description of how proposer shall meet California's 40' length limit while providing BRT styling such as the swept back 'aerodynamic' front end & windshield.

6.25 A description for the method of towing, hoisting and jacking of the vehicle, including any requirements for specific tools or equipment.

6.28.3 Provide details about flooring construction & Strength

6.28.5 Provide layout indicating interior steps and slopes of floor.

6.29 Provide detailed layout of driver's platform area

6.30 Provide detailed layout and technical information for the wheel housings.

VII. Section 7 – Articulated Joint

Not Applicable.

VIII. Section 8 – Chassis

Specific items to be addressed include:

8.a Frame Design Details

8.31 Suspension Details

8.33 Steering Details

8.34 Axle Details

IX. Section 9 – Friction Braking & Pneumatics System

Specific items to be addressed include:

9.36 Schematic piping diagram of the proposed braking system. Describe the system including ABS & ATC systems, control, and operation.

9.38 Schematic piping diagram of the proposed pneumatic system.

X. Section 10 – Low Voltage Electronics

Specific items to be addressed include:

10.41a Description of electronic bus system

10.41b General Requirements - Electrical design specifications and general guides that will applied to all low voltage systems. Generalized list of common electrical components provided as standard on all buses.

10.43 Multiplexing - Detail information about multi-plex system configuration, design, block diagram and interfaces.

10.43.1 What will be controlled by electronic bus system?

10.43.2 Where is hardware located?

10.45.5 Description of the electronic dashboard system, operation, and diagnostics.

XI. Section 11 – Operator's Area

Specific items to be addressed include:

11.45.2 Prevention of glare in windshield at night and arrangement of sun visors.

11.45.4 Prevention of glare and visibility of gauges and alarms.

11.46 Proposed fare box, radio controls, PA system and driver storage locations.

11.48 Provide detailed information about proposed driver's seat, and operation. Seat placement and adjustment with respect to controls, foot pedals, steering wheel and windshield.

11.48.8 Provide detailed interior mirror layout showing driver visibility of critical passenger areas such as behind the rear door modesty panel and forward bike rack area.

11.55.2 HVAC in driver area including defrosting.

11.74.1 Driver's barrier design.

XII. Section 12 – Heating, Ventilation and Cooling

Specific items to be addressed include:

12.53a An analysis justifying the design of air conditioning proposed for vehicle cooling.

12.53b A description of how the equipment will be installed. Include a layout drawing

12.53c Detailed description of bus power up and power down procedures. This should include a detailed description of how to start the bus, including any wait to start procedures and indicator lights.

12.55 The Proposer's approach to achieving the ventilation requirements.

12.58a The Proposer's proposed diagnostic system and special test equipment. A detailed discussion of the functions being provided and the operation of the equipment is essential.

12.58b Description of system maintenance requirements, particularly with most components likely roof mounted.

XIII. Section 13 – Bus Body

Specific items to be addressed include:

13.52 Provide window layout indicating window size & model #. Describe method for window protection from graffiti & etching. Describe method & time to replace sacrificial material.

13.67 Provide description of exterior access panels.

13.69 Provide bus paint technical information.

13.74 A description of the material and finish of interior liners and appointments, with an emphasis on meeting the fire performance requirements for the proposed materials.

13.74.9 Provide lighting layout and indicate lumens at various locations, measurements to be taken with a condition of no external light

13.76 Description of interior access panels, including ESS equipment access through the floor and engine access through the settee.
13.77 Provide seating plan, including seated passenger space, stanchion arrangements, door locations.

XIV. Section 14 – Door Operation and Control

Specific items to be addressed include:

14.79a Schematic or block diagrams, or both, of the proposed door control system. Provide detailed descriptions, with drawings and photographs (if available).

14.79b A thorough description of the proposed diagnostic system and special test equipment. Describe the functions being provided and the operation of the equipment.

14.79c A reference list for door systems being proposed indicating time entered service, number of years in service, and reported reliability.

14.79.2 Description of maintenance requirements for the doors, particularly the large, automatically controlled exit doors.

XV. Section 15 – Accessibility Requirements

Specific items to be addressed include:

15.80.1 Ramp design, operation, safety and manual operation
15.80.3 Layout showing pathway of wheelchair from entry door to securement area
15.80.5 Mobility device securements, space and maneuvering

XVI. Section 16 – Destination Sign System

Specific items to be addressed include:

16.a System proposed and capability
16.b System integration and downloading of information
16.c System integration with VTA's Advanced Communication System regarding route information
16.d Documentation of reliability performance
16.e System maintenance requirements

XVII. Section 17 – Communications

Specific items to be addressed include:

17.44 Data Communications – Data communications and interface details

17.44.1 Describe proposed locations of the various equipment, routing of cables & power, and understanding of requirements. Coordination of the communications system with VTA's ACS provider.

17.44.3 Proposer shall provide a description and block diagram of the proposed monitoring system, showing interfaces with other systems/subsystems.

XVIII. Section 18 – Video Surveillance

Specific items to be addressed include:

18.85a Proposed locations for cameras, recorder, system status display
18.85b System integration and coordination with manufacturer

XIX. Section 19 – Systems Support

This section shall provide the reviewer with a clear understanding of the Proposer's approach to providing support services for the smooth transfer of ownership. Specific items to be addressed include:

19.13.5aProposer shall provide a description of the organization and scheduling procedures to be followed in carrying out VTA's specified training program. The discussion shall cover the

provision of a complete instructional package which includes the materials, training aids, and documentation deemed necessary to satisfy the requirements for familiarization, operation, maintenance, and support of the vehicles supplied to VTA. The plan shall include identification of tasks to be accomplished, a schedule to accomplish the tasks, organizational responsibility, and a list of deliverables.

19.13.5b Proposer shall indicate any customer training programs that have been produced on similar projects and provide samples of previously used training materials.

19.13.5c Proposer shall provide approach to developing manuals including staffing, organization, integration, sample illustrations and plan for timely delivery.

19.13.5d Proposer shall provide a list of the diagnostic test equipment to be supplied. The Proposer should discuss the process that will be used to ensure that all diagnostic test equipment is delivered on time.

XX. Section 20 – Management Program

This section shall provide the reviewer with a clear understanding of the Proposer's approach to managing the project. Specific items to be addressed include:
Describe the overall organization and scheduling procedures, and tie together the System Assurance Plan, System Support Plan, Production Plan, and Test Plan. Description of management approach to be followed in the execution of work and demonstration of sufficient understanding of the management techniques required for proper implementation and control of the work. As a minimum, the following should be addressed/included:

- Organization – Provide an organization chart and description of responsibilities of all parties shown. Identify the personnel responsible for Engineering, Quality Assurance, and Warranty.
- Master Program Schedule – Provide a graphic display, with key milestones and events emphasized. Identify the critical path. Include narrative description necessary to facilitate a thorough understanding of the Proposer's plan of execution, including the method of critical path planning with special emphasis on contract documentation requirements, control of systems engineering, design, and test program, including "Altoona" test. Altoona testing is to be performed at the proposer's sole expense in order to quality. Wherever equipment/systems are to be modified or designed specifically for the project, the master program schedule shall include applicable development milestones, down to the subcontractor level, showing how such developments will be completed and qualified to support the contract delivery and performance requirements. The description should be brief, but contain sufficient detail to demonstrate the Proposer's approach to fulfilling the contract requirements.

Wherever equipment/systems are to be modified or designed specifically for the project, the master project schedule shall include applicable development milestones, down to the subcontractor level, showing how such developments will be completed & qualified to support the contract delivery & performance requirements.

XXI. Section 21 – Test Program

Test Program Plan – Describe the qualification and acceptance test program. The description shall cover development tests, system and equipment qualification tests, "Altoona" test, factory acceptance tests, installation tests, vehicle qualification tests, and vehicle acceptance tests. The testing that Contractor is to perform on the pilot bus shall include but not be limited to system cooling tests, HVAC performance tests, exterior and interior noise testing, acceleration tests with full passenger load, turning, and interior and exterior lighting performance. Include a discussion showing the process to correct deficiencies discovered during the testing, any re-testing and how the requirements of the Specification will be met.

The use of block diagrams, charts or other graphic presentations with brief narratives as aids in presenting the overall test program is acceptable.

XXII. Section 22 – Systems Assurance

This section shall provide the reviewer with a clear understanding of the Proposer's approach to integrating the systems and assuring quality of engineering and production. The Proposer shall describe the strategy to be implemented in the management, administration, and control of the Reliability and Maintainability (R&M) program to progressively achieve the required levels of R&M. The discussion shall address the full scope of the Reliability/Maintainability design including the following elements:

22.a Identification of R&M program tasks, organizational responsibilities and reporting procedures.

22.b Methods and format for submission of related contract deliverables.

22.c A description of the integrated R&M design functional processes and analysis requirements including the identification of the tasks, a schedule for accomplishing the tasks.

22.d Provide proposed Mean Time to Repair (MTTR) goals for corrective maintenance of the major subsystems.

22.e Proposed minimum preventative maintenance intervals and average time to perform preventative maintenance for the major systems and equipment.

22.f Provide vehicle maintainability design parameters for average corrective maintenance, expressed in Mean Time to Repair (MTTR). Include the maximum maintenance time to repair for at least 90% of all actions.

22.g Provide reliability predictions, expressed in Mean Time Between Failures (MTBF). Include a discussion of expected reliability, including actual experience with identical equipment on other transit properties. Discuss plans for monitoring reliability and methods to ensure that the minimum requirements of subcontractor-supplied equipment are met.

22.h Describe how the design process will be monitored and evaluated in order to ensure that potential safety hazards are mitigated or eliminated.

22.i Quality Assurance Plan. Describe the Quality Assurance (QA) organization and task assignments. The discussion should demonstrate that QA is an integral part of the design and manufacturing processes at both the prime and subcontractor levels. A description of the configuration control disciplines and procedures to be used by the contractor and subcontractors and the procedures to handle non-conforming parts shall be provided.

XXIII. Section 23 – Materials and Workmanship

Specific items to be addressed include:

23.a A description of the Contractor's approach to meeting the requirements for safety, fire, toxicity, and smoke.

23.b A discussion of the Contractor's corrosion control procedures.

23.WR.1 Clearly list, by warranty sections in RFP, how the proposer will comply with the warranty requested by VTA. Proposer must clearly indicate which parts of the warranty will be directly administered, and which sections will be a "pass through" warranty.

XXIV. Section 24 - Past Performance and References

In this section of the proposal, the relevant experience of the Proposer shall be described and shall identify:

24.a The name and location of the transit agency which procured the equipment. The quantity procured. The configuration of the equipment and year deployed

24.b Proposer shall provide three customer references to demonstrate that similar work has been satisfactorily performed in the past. For each referenced project, the Proposer shall provide the customer's name, address, and the telephone number of the client who is familiar with the Proposer's work.

24.c For each transit agency, the proposal shall address the requirements of the Section IP 13.5, Proposal Selection Process. The Proposer shall also provide information on failure rates for major vehicle subsystems, Energy Storage System, Electric drive, doors, articulation joint, destination signs, air conditioning, axles and ramp. Replacement schedules shall be provided for consumable items.

XXV. Section 25 - Service and Parts Support Statement

25. Proposer shall state on the form CER 5, "Contractor Service and parts Support Data" the representatives responsible for assisting VTA, 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.

XXVI. Section 26 - Deviations

26. Proposer shall present all requested deviations on form CER 6 "Form for Proposed Deviation or Approved Equal", completed according to IP 10, and shall be included in the Technical Proposal Package (excluding any price information). The Proposer should set forth, at a minimum, the specific reasons for each deviation so that it can be fully considered, and if appropriate, evaluated by VTA.

Acknowledgment of Addenda Form CER 4 shall be completed and included with the Contracts Administration/Qualification Package Requirements.

Package 1: Technical Proposal Requirements

The package layout and formatting shall match the section headings, and numbering list under "C. Individual Section Requirements" of this RFP.

1. Letter of Transmittal
2. Technical Proposal
3. Vehicle Technical Information (CER 10)
4. Contractor Service and Parts Support Data
5. Form for Proposal Deviation (without price data)
6. Engineering organization chart, engineering change control procedure, field modification process
7. Manufacturing facilities plant layout, other contracts, staffing
8. Production and delivery schedule and other Contract commitments for the duration of this Contract
9. Management Plan
10. Quality Assurance Plan
11. Complete warranty documentation including all sub-supplier warranty policies.

See later RFP sections for details.

PRICE PROPOSAL REQUIREMENTS

The Proposer is required to complete and execute the Price Schedule (CER 1) and provide within the price proposal. All prices shall include any applicable taxes. The Contractor shall be liable for payment of all taxes applicable to the completed bus as delivered and should add these amounts to the Offer price. VTA shall be

liable for any such state and local taxes applicable to the completed bus as delivered that are promulgated and become effective between the Due Date and the delivery date.

Special Tools and Diagnostic Equipment, see Section TS 5.6.4. As part of the Price Proposal, Proposer shall furnish prices for portable and shop test equipment, diagnostic equipment, and special tools required for these vehicles. VTA shall have the right to use software on other machines.

Training Aids and Materials, see TS 5.6.3, Proposer shall furnish pricing for providing all the training materials and specified training aids described in the Contract.

Spare Parts Package. As part of the Price Proposal, Proposer shall provide pricing for all of the spare parts shown on the Price Schedule and manufacturer's name and part#.

Training labor, As part of the Price Proposal, Proposer shall provide pricing for all of the spare parts shown on the Price Schedule

In addition, the Proposer shall provide the following information:

- Any requested deviations shall be presented on the Form for Proposal Deviation or Approved Equal, CER 6, completed according to IP 10, and included with the Price Proposal Package, including any price information.
- Bond or other offer security as required by Section IP 4.

Package 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.

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)
3. Deviations (with pricing information)

The Proposer is required to complete and execute VTA'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.

VTA shall be liable for any such state and local taxes applicable to the complete bus as delivered that are promulgated and become effective between the Due Date and the Delivery Date.

Package 3: Contracts Administration/Qualification Package Requirements

1) Pre-Award Evaluation Data Form, including but not limited to the following: A statement of the Proposer's experience record, the type of contract work previously performed, a list of Governmental agencies and/or private concerns for which the work was performed, a statement by the financial institutions with which the Proposer conducts business and a list of contracts, if any, on which failure to complete within a specified time resulted in the assessment of liquidated damages.

2) A copy of the three (3) most recent audited financial statement or a statement agreeing to present on site financial documentation with VTA's CFO or designee of sufficient completeness to satisfy requirements of Schedule Five of the pre-award evaluation data form
3) A letter from the Proposer's insurance carrier indicating the Contractor's ability to obtain the required insurance coverage amount for each type of insurance in accordance with the RFP requirements.
4) A letter from surety stipulating that the Proposer can obtain the all of the financial guarantee requirements in accordance with the RFP requirements; Offer Guarantee, Performance Bond, Payment Bond, and Warranty Bond. No pricing information shall be provided in this letter.
5) Proposal form included in CER 1. If the offer is made by an individual it shall be signed by him or her, and if he or she is doing business under a fictitious name the proposal shall so state. If the offer is made by a co-partnership, the full name and addresses of all members and the address of the co-partnership shall be stated and the offer shall be signed for all members by one or more members thereof. If the offer is made by a corporation, is shall be signed in the corporate name, by an authorized officer or officers. If the offer is made by a joint venture, the full name and addresses of all the members of the joint venture shall be stated and the offer shall be signed by each venturer.
6) Buy America Certification
7) Non-Collusion Affidavit
8) Lobbying Certification
9) DBE Approval Certification
10) Certification of Compliance with Bus Testing Requirements
11) Certificate of Compliance with Software Escrow Account Requirements.
12) Federal Motor Vehicle Safety Standards
13) Acknowledgement of Addenda
14) Past Performance and References

PROPRIETARY/CONFIDENTIAL INFORMATION PACKAGE

This package shall include any material that the Proposer has identified as proprietary information, trade secrets or confidential commercial and financial information as set forth in Section IP 12.4.

Package 4: Proprietary/Confidential Information Package Requirements

1. Proprietary / Confidential Information
2. Trade Secrets

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.

The Proposer is advised that VTA is a public agency and, as such, may be subject to certain state and/or local Public Records Act provisions regarding the release of information concerning this RFP. If a request is received by VTA for the release of Proposer's proprietary/confidential information, then subject request will be referred to the Proposer for review and consideration. If Proposer chooses to declare the information

proprietary/confidential and withhold it from release, then it shall defend, indemnify, and hold harmless VTA from any legal action arising from such a declaration.

IP 9.4 Agency Treatment of Proprietary/Confidential Information

Access to government records is governed by the California Public Records Act (Gov. Code 6250 et seq.). Except as otherwise required to be disclosed by the California Public Records Act or other applicable law, VTA will exempt from disclosure proprietary information identified in Package 4.

Upon a request for records from a third party regarding this Proposal, VTA will notify the Proposer in writing. The Proposer must respond within ten (10) business days with the identification of any and all "proprietary, trade secret or confidential commercial or financial" information. Failure to respond within the allowed period shall be deemed an approval to release. The Proposer shall indemnify VTA's defense costs associated with its refusal to produce such identified information; otherwise, the requested information may be released.

VTA shall employ sound business practices no less diligent than those used for VTA's own confidential information to protect the confidence of all licensed technology, software, documentation, drawings, schematics, manuals, data and other information and material provided by the Proposer and the Contractor pursuant to the Contract that contain confidential commercial or financial information, trade secrets or proprietary information as defined in or pursuant to the California Public Records Act against disclosure of such information and material to third parties, except as permitted by the Contract. The Contractor shall be responsible for ensuring that confidential commercial or financial information, trade secrets or proprietary information bears appropriate notices relating to its confidential character.

IP 9.5 Signing of Proposal Forms

Proposal 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, facsimile (fax) 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 VTA. The Proposer shall submit with its Proposal a copy of the joint venture agreement.

Proposal 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 9.6 Modification or Withdrawal of Proposal

A modification of a Proposal already received will be accepted by VTA only if the modification is received prior to the Proposal Due Date; is specifically requested by VTA; or is made with a requested BAFO. 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 VTA, 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 VTA fails to award the Contract within the Proposal validity period prescribed in "Duration of the Validity of Proposal," 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 Proposal.

This provision for modification and withdrawal of Proposal may not be utilized by a Proposer as a means to submit a late proposal and, as such, will not alter VTA's right to reject a proposal.

IP 9.7 Ownership and Cost of Proposal Development

The Proposal will become the property of VTA.

This RFP does not commit VTA to enter into a Contract, to pay any costs incurred in the preparation or presentation of a Proposal, or to procure or contract for the equipment.

IP 9.8 Proposal Opening, Evaluation, Negotiation and Selection

This procurement will be based on procedures consistent with FTA's Lo/No guidelines. Other than proprietary information, the content of this RFP, any Proposal received, and any other communications between VTA and a potential Proposer on a contract shall be made available to the public upon issuance of a "Notice of Recommended Award."

The Proposer shall be advised that VTA will not consider any information in a Price Proposal as proprietary.

The Proposal will be evaluated, negotiated, selected and any award made in accordance with the criteria and procedures described below.

The Contract will be awarded to the Proposer if their Proposal provides the greatest value to VTA. VTA will base its determination on if the Proposal represents the "best value" on an analysis of the tradeoff of qualitative technical factors and price or cost factors.

Discussions and negotiation may then be carried out with the Proposer, after which BAFOs may be requested.

However, VTA may select the Proposal for award without any discussions or negotiations or request for any BAFOs. IF VTA doesn't exercise its right to reject the Proposal and the Proposal is found to be most advantageous to VTA, then the Proposal will be selected, based upon consideration of the criteria of "Proposal Selection Process" below.

VTA reserves the right to cancel the procurement, for sound business reasons, at any time before the Contract is fully executed and approved.

IP 9.9 Confidentiality of Proposal

Proposal will not be publicly opened. The Proposal and evaluations will be kept strictly confidential throughout the evaluation, negotiation, and selection process, except as otherwise required by applicable law. Only the members of the Selection Committee, and other VTA officials, employees, and agents having a legitimate interest will be provided access to the Proposal and evaluation results during this period.

IP 9.10 Duration of the Validity of Proposal

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

IP 9.11 Selection Committee / Technical Advisory Team (TAT)

A Selection Committee, which will include VTA staff (and non-VTA staff if necessary), will be established. The Selection Committee will carry out the detailed evaluations, including carrying out negotiations, and making the selection of the Proposer, if any, that may be awarded the Contract.

The Technical Advisory Team (TAT) will be formed only if the Selection Team determines that it is necessary. The TAT's role is to evaluate the various aspects of the Proposal, such as technical or management components and other areas, as determined necessary by the Contract Administrator and the Project Manager. The TAT shall consist of VTA staff (recommended by the Project Manager and approved by the Contract Administrator), and report analysis to the Selection Team. The TAT will not have voting rights and their role is to serve as a Technical or Subject Matter expert and provide analysis and recommendation to the Selection Team.

IP 9.12 Review of Proposal for Responsiveness and Proposer for Responsibility

The 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.

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

IP 9.13 Proposal Selection Process

The following describes the process by which the Proposal will be evaluated and a selection made for a potential award. Any such selection of a proposal by a responsible Proposer shall be made by consideration of only the criteria of "Qualification Requirements" and "Proposal Evaluation Criteria" below.

"Qualification Requirements" specify the requirements for determining responsible Proposer, all of which must be met by an Proposer to be found qualified. Final determination of an 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 of 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 VTA's best interest, based on price and other evaluation criteria considered. An award will be based upon consideration of a combination of technical and

price factors to determine the offer deemed to be the most advantageous and of the greatest value to the procuring agency. Accordingly, VTA may not necessarily make an award if doing so would not be in the overall best interest of the agency.

The procedures to be followed for these evaluations are provided in "Evaluation Procedures" (IP 13.6).

Qualification Requirements:
The following are the requirements for qualifying a responsible Proposer. All of these requirements must be met; therefore, they are not listed by any particular order of importance. Any proposal that the Selection Committee finds not to meet these requirements, and cannot be made to meet these requirements, may be determined by the Selection Committee not to be responsible and its proposal rejected. The requirements are as follows:

I. Sufficient financial strength and resources and capability to finance the work to be performed and complete the Contract in a satisfactory manner as measured by:

A. Proposer's financial statements audited by an independent certified public accountant authorized to practice in the jurisdiction of either VTA or the Proposer, and prepared in accordance with United States Generally Accepted Accounting Principles (GAAP), or national equivalent accounting standards where GAAP financial statements are unavailable.

B. Ability to secure required bond(s) as evidenced by a letter of commitment from an underwriter confirming that the Proposer can be bonded for the required amount.

C. Willingness of any parent company to provide the required financial guaranty evidenced by a letter of commitment signed by an officer of the parent company having the authority to execute the parent company guaranty.

D 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.

II. Evidence that the human and physical resources are sufficient to perform the contract as specified (Sections 16 & 17 of 12.3) and assure delivery of all equipment within the time specified in the Contract, to include:

A. Engineering, management and service organizations with sufficient personnel and requisite disciplines, licenses, skills, experience, and equipment to complete the Contract as required and satisfy any engineering or service problems that may arise during the warranty period.

B. Adequate manufacturing facilities sufficient to produce and factory-test equipment on schedule. This may be confirmed by a site visit.

C. 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.

III. Evidence by ISO 9000 certification or other equivalent documentation that Proposer is qualified in accordance with Part 3: Quality Assurance Provisions.

IV. 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, and warranty claims. Evidence shall be by client references.

Proposal Evaluation Criteria:

Following receipt of the Proposal, the Proposal will be evaluated for compliance with the following minimum requirements. If the Proposal does not evidence compliance with the solicitation requirements it may be deemed non-responsive and may not be considered beyond the preliminary review.

Minimum Requirements

- The Proposer must be an existing vehicle manufacturer with an existing manufacturing facility.
- The Proposal must be for a high-capacity vehicle with a nominal length not to exceed 43 Feet.
- The proposed vehicle must have a minimum of 37 seats.

If the Proposal is found to be compliant with the minimum qualifications it will then be evaluated to determine if the Proposal represents a technically acceptable offer.

Each Proposal will be rated according to the following ratings:

Rating	Definition
Exceptional	Exceeds evaluation standard in a way beneficial to VTA, and has no significant weaknesses. Innovative, comprehensive and complete in all details. Low-risk. Complies with all primary program objectives for the procurement.
Acceptable	Meets evaluation standards, and any weaknesses are readily correctable. Limited risk. Complies with many of the primary program objectives for the procurement.
Marginal	Fails to meet evaluation standard; however, any significant deficiencies are correctable. Lacks essential information to support Proposal. Moderate risk. Complies with only one or two of the program objectives for the procurement.
Unacceptable	Fails to meet evaluation standard, and the deficiency is uncorrectable. Proposal would have to undergo a major revision to become acceptable. Demonstrated lack of understanding of VTA's requirements or omissions of major areas. Unacceptable risk. Complies with none or one of the program objectives for the procurement.

Performance risk is the evaluation of the Proposer's present and past work to assess confidence in the Proposer's ability to perform against a proposed Contract. The following definitions are used when assessing performance risk:

Rating	Definition
High	Significant doubt exists, based on the Proposer's performance record, that the Proposer can perform the proposed effort.
Moderate	Some doubt exists, based on the Proposer's performance record, that the Proposer can perform the proposed effort.
Low	Little doubt exists, based on the Proposer's performance record, that the Proposer can

	perform the proposed effort.
Not applicable	No significant performance record is identifiable.

VTA may require clarifications or oral interviews with the Proposer. Discussions may also be held with the Proposer to determine acceptability of proposed deviations and/or to address deficiencies and weaknesses of the Proposal. See "Agency Rights" for additional information.

The award will be made to the Proposer that possesses the appropriate facility, as well as the managerial, financial and technical capabilities necessary to fulfill the requirements of the Contract, and whose Proposal conforms to Solicitation requirements and is judged by an integrated assessment of the evaluation criteria to be most advantageous to VTA, when price and other factors are considered.

VTA reserves the right to reject the Proposal, to waive informalities or irregularities to the extent permitted by law in the Proposal received, and to be the sole judge of the merits of the Proposal received.

The following are the complete criteria, listed by their relative degree of importance, by which Proposal from responsible Proposer will be evaluated for a potential award. Any exceptions, conditions, reservations or understandings explicitly, fully and separately stated on the "Form for Proposal Deviation or Approved Equal" (Section CER 6) which do not cause VTA to consider a proposal to be non-responsive, will be evaluated according to the respective evaluation criteria and/or sub-criteria which they affect. Where alternative subsystems are proposed, the alternatives will be evaluated and ranked.

The criteria are listed below 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.

- Technical
- Management Plans
- Past Performance
- Price

A. Technical Proposal Evaluation Criteria:

The Technical Proposal will be evaluated on the basis of the following criteria, listed in descending order of importance:

I. **Technical Approach:** A high rank will be awarded to the Proposer if their proposal best demonstrates a technical approach likely to result in problem free operation.

II. **System Integration:** A high rank will be awarded to the Proposer if their Proposal demonstrates that they have extensive experience with best results in performing the system integration tasks associated with new equipment installation.

III. **Quality Assurance:** A high rank will be awarded to the Proposer if their Proposal is judged to have the best in-place Quality Assurance Procedures specific to this Contract.

IV. **System Support:** Ranking in this category will be determined from the Proposer's demonstrated:

- Ability to meet or exceed reliability and maintainability requirements

- Suitability of test equipment including availability of electronic maintenance documentation and comprehensive plan for providing technical updates for the life of the proposed vehicles.
- Quality of publications including availability of engineering drawings and solid models of parts and components of the vehicle.
- Effectiveness of training programs
- Quality and performance of parts support including service center staffing and qualifications and proposed availability of spare parts, including methodology for storing parts locally and expediting needed parts.
- Quality and performance of Warranty and Technical Support and including all sub-supplier and pass-through warranties and technical support in the form of proposed diagnostic equipment required to maintain the vehicles and provisions for advanced features; such as, wireless self-diagnostics in conjunction with maintenance database management.

B. Management Plans Based On:

I. **Management Plans:** A high score will be allotted to the Proposer if their Proposal demonstrates a management approach likely to result in vehicles delivered on schedule and in accordance with Contract requirements while considering the cost of overseeing the contract.

C. Past Performance Based On:

I. **Past Performance:** The Proposal will be evaluated to determine whether performance on similar contracts has been satisfactory. Factors such as schedule performance, engineering, assembly and manufacturing quality, field product support, and warranty will be examined for past contracts. Other agencies may be contacted for this portion of the evaluation. In addition, the Proposer's overall capabilities in terms of manufacturing facilities, and engineering capability will be evaluated.

D. Price Evaluation Criteria:

The Price Proposal shall be opened after technical and schedule credibility has been established by Technical Proposal and the Company Resources information from the Contracts Administration Package has been reviewed.

I. The Price Proposal will only be evaluated if the Proposer's technical Proposal has been determined to be technically responsive.

II. The price for evaluation purposes shall be the price for the total quantity of vehicles and chargers, including all optional quantities, with engineering, manuals, training, spare parts, special tools and diagnostic test equipment, including any taxes, delivery charges or other fees. This base price offer must be less than that for any optional offers.

III. Any proposal which is materially unbalanced may be rejected. An unbalanced proposal is one which is based on prices that are significantly overstated for some items and understated for other items.

IV. It is expected that this contract will be awarded upon a determination that there is adequate price competition; therefore, the Proposer is not required to submit or certify cost or pricing data with its proposal.

V. If, after receipt of Proposal, the Purchasing Agent determines that adequate price competition does not exist, the Proposer shall provide certified cost or pricing data as requested by the Purchasing Agent.

Type of Contract to be Awarded

VTA intends to award a fixed-price Contract for five (5) 40' Low Floor Full Battery Electric Transit Buses. The services of the Contractor will be based on the Scope of Work as outlined in "Section 1: Description of Work."

Period for Acceptance

The Proposal shall be valid for 270 calendar days from the date stipulated in the RFP for receipt of Proposal. If this offer is accepted within that time period, the Proposer agrees to furnish all services and items as stipulated in the RFP and in any accompanying amendments.

IP 9.14 Evaluation Procedures

All aspects of the evaluations of the Proposal and any discussions/negotiations, including documentation, correspondence and meetings, will be kept confidential during the evaluation and negotiation process.

The Proposal will be analyzed for conformance with the instructions and requirements of the RFP and Contract documents. If the Proposal does not comply with these instructions and does not include the required information it may be rejected as insufficient. VTA reserves the right to request that a Proposer provide any missing information and make corrections. The Proposer is advised that the detailed evaluation forms and procedures will follow the same Proposal format and organization specified in "Preparation of Proposal." Therefore, the Proposer 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 Request for Pre-Offer Change Form or the Form for Proposal Deviation or Alternative Equal. 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.

IP 9.15 Evaluations of Competitive Proposal

1. **Detailed evaluation of Proposal .** VTA will carry out and document its evaluations in accordance with the criteria and procedures set forth in "Proposal Selection Process." The Technical Proposal shall be evaluated using a narrative scoring system. The Technical Proposal shall be compared with the proposal requirements, and the content against each of the requirements shall be evaluated according to the following narrative scale:

    - Unacceptable
    - Marginal (Can probably be made acceptable)
    - Acceptable

- Exceptional

Where any section of the proposal falls into a category other than acceptable, the shortfall or exceedence will be described. The process of evaluation shall be:

1. Review the Proposal.
2. Identify where the proposal does not meet the specification.
3. Determine the classification of the non-conformance.
4. Determine which evaluation criteria are impacted and assign the shortfall/exceedence description to the appropriate category of technical or schedule credibility.

The results of the evaluation for all Proposal shall be gathered, compared and ranked for each of the evaluation criteria.

After review of the Proposal, VTA may call for clarification of minor issues to assure a complete understanding of Proposal and adjust evaluations made with faulty information. Clarifications may be addressed through telephone calls or meetings, and will be confirmed in writing.

2. **Discussions with Proposer found to meet VTA's Requirements.** The Proposer whose Proposal is found by VTA to meet VTA's requirements as set forth within this solicitation will be notified and any questions or requests for clarifications provided to them in writing. The Proposer may be invited for an interview and discussions with VTA to discuss answers to written or oral questions, clarifications and any facet of its Proposal.

   In the event that a Proposal that has been found to meet VTA's solicitation requirements 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, VTA 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.

   No information, financial or otherwise, will be provided to any Proposer about any of the Proposal from other Proposers, to the extent permitted by applicable law. Proposer 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.

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

5. **Best and final offers.** After all interviews have been completed, the Proposer may be afforded the opportunity to amend their Proposal and submit their BAFOs. The Request for BAFOs shall include the following:

   a. Notice that discussions/negotiations are concluded;
   b. Notice that this is the opportunity for submission of a BAFO;
   c. A common date and time for submission of written BAFOs, allowing a reasonable opportunity for preparation of the written BAFOs;

d. 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 and is subject to the late submissions, modifications, and withdrawals of Proposal provisions of the Request for Proposal;
e. Notice that if Proposer does not submit a BAFO or a notice of withdrawal and another BAFO, their immediate previous Offer 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 VTA according to the same requirements and criteria as the initial Proposal ("Proposal Selection Process"). VTA 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 VTA and considered according to the relative degrees of importance of the criteria defined in "Proposal Selection Process."

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

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

BAFO proposal price schedule must be submitted using the pricing schedule provided in section CER 1 of this RFP. BAFOs not using this proposal schedule, or incomplete proposal schedules, will not be accepted.

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

IP 10. Response to Proposal

IP 10.1 Single Proposal Response

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

IP 10.2 Availability of Funds

This procurement is subject to the availability of funding.

VTA's obligation hereunder is contingent upon the availability of appropriated funds from which payment for the Contract purposes can be made. No legal liability on the part of VTA for any payment shall arise until funds are made available to the Contract Administrator for this Contract and until the Contractor receives notice of such availability, to be confirmed in writing by the Contract Administrator. Any award of Contract hereunder will be conditioned upon said availability of funds for the Contract.

IP 10.3 Agency Contract Approval Process

Section not used.

IP 10.4 Agency Rights

VTA 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 VTA.

VTA reserves the right to reject the Proposal, to undertake discussions with the Proposer, and to accept that Proposal or a modified Proposal which, in its judgment, will be most advantageous to VTA, considering price and other evaluation criteria. VTA 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. VTA reserves the right to waive any defects, or minor informalities or irregularities in any Proposal that does not materially affect the Proposal.

If there is any evidence indicating that the Proposer is in collusion to restrict competition or are otherwise engaged in anti-competitive practices, the Proposal of such Proposer shall be rejected, and such evidence may be a cause for disqualification of the participant in any future solicitations undertaken by VTA.

VTA may reject a Proposal that includes unacceptable changes as provided in the Pre-Offer Change Form and deviations as provided in the Form for Proposal Deviation or Alternative Equal.

IP 10.5 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 twenty (20) 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 9.4.

IP 11. Conflicts of Interests and Gratuities

The Proposer is prohibited from engaging in any practice that may be considered a conflict of interest under existing VTA 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.

IP 12. Agency-Specific Provisions

13.1 INTEREST OF MEMBERS OF, OR DELEGATES TO, CONGRESS

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 any benefit arising therefrom. (41 U.S.C. § 22.)

13.2 PROHIBITED INTEREST

No member, officer, or employee of VTA or of a local public body during his tenure or one year thereafter shall have any interest, direct or indirect, in this Contract or the proceeds thereof.

SECTION 3: GENERAL CONDITIONS

GC 1. Definitions

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

Agency: Santa Clara Valley Transportation Authority (VTA)

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 VTA, or if the Proposer does not promptly respond to a request for a BAFO, then the most recent, current Proposal is the BAFO.

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.

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

Contract Administrator: The person who is executing this Contract on behalf of VTA 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.

Days: For the purpose of this RFP, all references herein to "day" shall mean calendar day, unless specified otherwise. All references to "calendar day" shall mean any day, including Saturday, Sunday, and all legal holidays. All references to "business day" shall mean any business day, excluding Saturdays, Sundays and legal holidays.

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 contractor adversely affects its performance.

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

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

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

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 VTA documented using the prescribed form in the solicitation, including any Proposal or BAFO.

Proposer: A legal entity that makes a Proposal.

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

Solicitation: An Agency's request for Proposal.

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 VTA.

Supplier: Any manufacturer, company or Agency providing units, components or subassemblies for inclusion in the bus 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.

GC 2. Materials and Workmanship

The Contractor shall be responsible for all materials and workmanship in the construction of the bus and all accessories used, whether the same are manufactured by the Contractor or purchased from a Supplier. This provision excludes any equipment leased or supplied by VTA (such as tires, radios, etc.), except insofar as such equipment is damaged by the failure of a part or component for which the Contractor is responsible, or except insofar as the damage to such equipment is caused by the Contractor during the manufacture of the buses. Risk of damage to or loss of the buses is the subject of "Risk of Loss" (Section GC 4.2).

GC 3. Conformance with Specifications and Drawings

Materials furnished and Work performed by the Contractor shall conform to the requirements of the Technical Specifications and other Contract documents. Including the provision of drawings, technical specifications or other data by VTA, the Contractor shall have the responsibility of supplying all parts and details required to make the bus complete and ready for service even though such details may not be specifically mentioned in the drawings and specifications. Items that are installed by VTA shall not be the responsibility of the Contractor unless they are included in this Contract.

Omissions from the Contract specifications, or the inaccurate description of details of Work that are manifestly necessary to carry out the intent of the Contract specifications, or that are customarily performed, shall not relieve the Contractor from performing such omitted Work or inaccurately described details of the 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

VTA's Representative shall, at all times have access to the 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 Work done shall be subject to VTA Representative's inspection and *approval in accordance with the approved 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.

See also sections SP 1.5 and SP 1.6. Within twenty (20) calendar days after arrival at the designated point of delivery, the bus shall undergo VTA tests, as defined in "Post-Delivery Tests." If the bus passes these tests or if VTA fails to notify the Contractor, in writing, of non-acceptance within twenty (20) calendar days after delivery, then acceptance of the bus by VTA occurs on the 20th day after delivery. If the bus fails these tests, VTA shall not accept the bus until the repair procedures, as defined in "Repairs after Non-Acceptance" have been carried out and the bus has been re-tested until it passes. Acceptance occurs earlier only if VTA notifies the Contractor of early acceptance in writing or places the bus in revenue service. "Post-Delivery Tests" shall include final testing and commission of the provided electric bus chargers.

*Throughout this RFP, any required approval by VTA does not relieve the Contractor from meeting the requirements of the Contract Documents.

GC 4.2 Risk of Loss

VTA shall assume risk of loss of the bus on delivery, as defined in "Bus Delivery." Prior to this delivery, the Contractor shall have risk of loss of the bus, 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 en route, and the log shall be delivered to VTA with the bus. If the bus is released back to the Contractor for any reason, then the Contractor has the risk of loss upon such release.

GC 5. Title and Warranty of Title

Contractor shall provide adequate documents for registering the bus in the State of California not less than ten (10) business days before delivery to VTA. Upon acceptance of each bus, the Contractor warrants that the title shall pass to VTA free and clear of all encumbrances.

GC 6. Intellectual Property Warranty

VTA shall advise the Contractor of any impending patent suit related to this Contract against VTA and provide all information available. The Contractor shall defend any suit or proceeding brought against VTA based on a claim that any equipment, or any part thereof, furnished under this Contract constitutes an infringement of any patent, and the Contractor shall pay all damages and costs awarded therein, excluding incidental and consequential damages against VTA. In case said equipment, or any part thereof, is in such suit held to constitute infringement and use of said equipment or parts is enjoined, the Contractor shall, at its own expense and at its option, either procure for VTA the right to continue using said equipment or part, or replace same with non-infringing equipment, or modify it so it becomes non-infringing.

The Contractor's obligations under this section are discharged and VTA shall hold the Contractor harmless with respect to the equipment or part if it was specified by VTA and all requests for substitutes were rejected, and the Contractor advised VTA under "Questions, Clarifications and Omissions" of a potential infringement, in which case the Contractor shall be held harmless.

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:

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

VTA shall protect proprietary information provided by the Contractor to the fullest extent of the law. The Contractor shall grant a non-exclusive license to allow VTA to utilize such information in order to maintain the vehicles. Contractor shall provide such information in a timely manner upon request by VTA. In the event that the Contractor no longer has the information, VTA has the right to reverse-engineer patented parts and software.

VTA 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.

For the purposes of this section "supply orders" exclude bulk items that the contractor purchases for the construction of the bus such as fittings, hoses, wiring, fasteners, and raw structural material. This does not exclude any functional subsystem on the bus including but not limited to: head signs, multiplex, seating, windows, hydraulic, air, brake, HVAC, drive, etc.

GC 7.2 Access to Onboard Operational Data

Upon request from the Contractor, VTA may grant 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 engineering type Work for the bus. Passive data collection or remote communication by the Contractor with the bus without the direct approval of VTA is prohibited. 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 VTA 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 Contract Administrator. The Contractor shall be liable for all costs resulting from, and/or for satisfactorily correcting, any specification change not properly ordered by written modification to the Contract and signed by the Contract Administrator.

GC 8.2 Agency Changes

VTA 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 Contract Administrator a detailed price and schedule Proposal for the Work to be performed. This Proposal shall be accepted or modified by negotiations between the Contractor and the Contract Administrator. 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 ordered.

GC 9. Legal Clauses

GC 9.1 Indemnification

GC 9.1.1 The Contractor shall, to the extent permitted by law: (1) protect, indemnify and save VTA and its officers, employees and agents, including consultants, harmless from and against any and all liabilities, damages, claims, demands, liens, encumbrances, judgments, awards, losses, costs, expenses and suits or actions or proceedings, including reasonable expenses, costs and attorneys' fees incurred by VTA and its officers, employees and agents, including consultants, in the defense, settlement or satisfaction thereof, for any injury, death, loss or damage to persons or property of any kind whatsoever, arising out of or resulting from the intentional misconduct or negligent acts, errors or omissions of the Contractor in the performance of the Contract, including intentional misconduct, negligent acts, errors or omissions of its officers, employees, servants, agents, Subcontractors and Suppliers; and (2) upon receipt of notice and if given authority, shall settle at its own expense or undertake at its own expense the defense of any such suit, action or proceeding, including appeals, against VTA and its officers, employees and agents, including consultants, relating to such injury, death, loss or damage. Each party shall promptly notify the other in writing of the notice or assertion of such claim, demand, lien, encumbrance, judgment, award, suit, action or other proceeding hereunder. The Contractor shall have sole charge and direction of the defense of such suit, action or proceeding. VTA shall not make any admission that might be materially prejudicial to the Contractor unless the Contractor has failed to take over the conduct of any negotiations or defense within a reasonable time after receipt of the notice and authority above provided. VTA shall, at the request of the Contractor, furnish to the Contractor all reasonable assistance that may be necessary for the purpose of defending such suit, action or proceeding, and shall be repaid all reasonable costs incurred in doing so. VTA shall have the right to be represented therein by advisory council of its own selection at its own expense.

GC 9.1.2 The obligations of the Contractor under the above paragraph shall not extend to circumstances where the injury, death or damages are caused solely by the negligent acts, errors or omissions of VTA, its officers, employees, agents or consultants, including, without limitation, negligence in: (1) the preparation of the Contract documents, or (2) the giving of directions or instructions with respect to the requirements of the Contract by written order. The obligations of the Contractor shall not extend to circumstances where the injury, death or damages are caused, in whole or in part, by the negligence of any third-party operator, not

including an assignee or Subcontractor of the Contractor, subject to the right of contribution. In case of joint or concurrent negligence of the parties giving rise to a claim or loss against either one or both, each shall have full rights of contribution from the other.

GC 9.2 Suspension of Work

GC 9.2.1 VTA 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 for a specified period of time.

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 covered by the suspension during the period of work stoppage. Contractor shall continue the Work 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 upon expiration of the notice of suspension, or upon direction from VTA.

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 Contract Administrator 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 VTA or by a cause as described below, then the time for completion and/or affected delivery date(s) shall be extended by VTA 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/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 VTA as described in paragraph GC 9.3.4 below.

A delay in meeting all of 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 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 VTA reserves the right to rescind or shorten any extension previously granted, if subsequently VTA 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, VTA will not rescind or shorten any extension previously g ranted 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 VTA 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 affected, is filed by the Contractor with VTA 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. VTA shall make its determination within thirty (30) calendar days after receipt of the application.

GC 9.4 Termination

GC 9.4.1 Termination for Convenience

The performance of Work under this Contract may be terminated by VTA in accordance with this clause in whole, or from time to time in part, whenever the Contract Administrator shall determine that such termination is in the best interest of VTA. Any such termination shall be effected by delivery to the Contractor of a notice of termination specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination becomes effective.

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

- Stop Work under the Contract on the date and to the extent specified in the notice of termination.
- Place no further orders 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 VTA in the manner, at the times, and to the extent directed by the Contract Administrator, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated, in which case VTA 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 Contract Administrator, 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 VTA and deliver in the manner, at the times and to the extent, if any, directed by the Contract Administrator 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 VTA.

- 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 Contract Administrator, 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 Contract Administrator, and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by VTA 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 Contract Administrator 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 Contract Administrator 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 VTA has or may acquire an interest.

The Contractor shall be paid its costs, including Contract close-out costs, and profit on Work performed up to the time of termination. The Contractor shall promptly submit its termination claim to VTA 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.

GC 9.4.2 Termination for Default

VTA may, by written notice of default to the Contractor, terminate the whole or any part of this Contract if the Contractor fails to make delivery of the supplies or to perform the services within the time specified herein or any extension thereof; or if the Contractor fails to perform any of the other material provisions of the Contract, or so fails to make progress as to endanger performance of this Contract in accordance with its terms, and in either of these two circumstances does not cure such failure within a period of ten (10) business days, or such longer period as the Contract Administrator may authorize in writing, after receipt of notice from the Contract Administrator specifying such failure.

If the Contract is terminated in whole or in part for default, VTA may procure, upon such terms and in such manner as the Contract Administrator may deem appropriate, supplies or services similar to those so terminated. The Contractor shall be liable to VTA 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, 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 supplies delivered to and accepted by VTA shall be at the Contract price. VTA may withhold from amounts otherwise due the Contractor for such completed supplies such sum as the Contract Administrator determines to be necessary to protect VTA against loss because of outstanding liens or claims of former lien holders.

If, after notice of termination of this Contract under the provisions of this clause, it is determined for any reason that the Contractor was not in default under the provisions of this clause, or that the default was excusable under the provisions of this clause, then the rights and obligations of the parties shall be the same as if the notice of termination had been issued pursuant to termination for convenience of VTA.

GC 9.5 Compliance with Laws and Regulations

The Contractor shall at all times comply with all applicable laws, regulations, policies, procedures and directives (together, the "Law"), including without limitation, FTA regulations, policies, procedures and directives, including those listed directly or by reference in the agreement between VTA 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 VTA 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 Forum Selection

This Contract shall be governed by the laws of the State of California without regard to conflict of law rules. Contractor will resolve any claim, cause of action or dispute (collectively "claim") that Contractor has with VTA arising out of or related to this Contract in a state or federal court located in Santa Clara County, California. Contractor agrees to submit to the personal jurisdiction of the courts located in Santa Clara County, California for the purpose of litigating all such claims.

GC 9.8 Disputes

Except as otherwise provided in this Contract, any dispute concerning a question of fact arising under or related to this Contract that is not disposed of by agreement shall be decided in accordance with the following steps. However, by mutual agreement the matter may be taken immediately to any higher step in the dispute resolution process, or a mutually agreed-to alternative dispute resolution process (which may include structured negotiations, mediation or arbitration) or litigation. Pending final resolution of a dispute hereunder, the Contractor shall proceed diligently with the performance of the Contract and in accordance with the Contract Administrator's or Chief Executive Officer's decision, as the case may be.

1. **Notice of dispute.** All disputes shall be initiated through a written dispute notice submitted by either party to the other party within 10 (ten) calendar days of the determination of the dispute.

2. **Negotiation between Contract Administrators.** The parties shall attempt in good faith to resolve any dispute arising out of or relating to this Contract promptly by negotiation between executives who have authority to settle the controversy and who are at a higher level of management than the people with direct responsibility for administration of this Contract. Any party may give the other party written notice of any dispute not resolved in the normal course of business as provided in paragraph 1 above. Within 14 (fourteen) calendar days after delivery of the dispute notice, the receiving party shall submit to the other party a written response. The dispute notice and written response shall include: (a) a statement of the party's position and a summary of the arguments supporting that position, (b) any evidence supporting the party's position and (c) the name of the executive who will

represent that party and of any others who will accompany the executive in negotiations. Within 28 (twenty-eight) calendar days after delivery of the dispute notice, the Contract Administrator of both parties shall meet at a mutually acceptable time and place, and thereafter as they reasonably deem necessary to attempt to resolve the dispute. All reasonable requests for information by one party to the other shall be honored.

If the matter has not been resolved by these people within 42 (forty-two) calendar days of the dispute notice, the dispute may be referred to more senior executives of both parties who have authority to settle the dispute and who shall likewise meet to attempt to resolve the dispute.

3. **Chief Executive Officer's decision.** Should the dispute not be resolved by negotiation between Contract Administrators, as provided in paragraph 2 above, VTA's Contract Administrator from paragraph 2 above shall submit a written request for decision to VTA's Chief Executive Officer (CEO) along with all documentation and minutes from the negotiations. The Chief Executive Officer shall issue a written decision within 14 (fourteen) days of receipt of a request.

   A. For disputes involving $50,000 or less, the decision of the CEO shall be administratively final and conclusive. For disputes involving $50,000 or less, it is the intent of the parties that such administratively final and conclusive decision pursuant to either this paragraph or paragraph 4 shall be overturned only if determined by a court of competent jurisdiction to be fraudulent, arbitrary, capricious, unsupported by the evidence or so grossly erroneous as to imply bad faith. For disputes greater than $50,000, the decision of the CEO shall be administratively final and conclusive unless, within thirty (30) days from the date of delivery of the written decision, the Contractor appeals the decision in writing to VTA's Chief Executive Officer or designee, who shall render a written decision within fourteen (14) days of delivery of such written appeal. Such decision by the Chief Executive Officer or his or her designee shall be administratively final and conclusive.

   B. Within thirty (30) days of the issuance of any administratively final and conclusive decision under this paragraph, the Contractor shall notify VTA in writing of the Contractor's agreement with the final decision. Failure to provide such written notice of agreement shall indicate an intent by the Contractor to litigate the claim.

   C. Any dispute that is not resolved by the parties through the operation of the provisions of this paragraph, or any mutually agreed-upon alternative disputes resolution process pursuant to paragraph 4, may be submitted to any court in Santa Clara County, State of California.

   D. Pending final resolution of a dispute hereunder, the Contractor shall proceed diligently with the performance of its obligations under the Contract in accordance with the written directions of VTA.

4. **Alternatives disputes resolution.** VTA does not wish to use the arbitration option.

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 VTA is the FTA recipient or a sub-grantee of the FTA recipient, the Contractor agrees to provide VTA, FTA, the Comptroller General of the United States, the Secretary of the U.S. Department of Transportation, State of

California 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 Contract Administrator, 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 Contract Administrator, 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 Contract Administrator may renegotiate the Contract modification or change order price adjustment, and VTA 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.

GC 9.10 Confidential Information

Access to government records is governed by the California Public Records Act (Gov. Code 6250 et seq.). Except as otherwise required by the California Public Records Act (Gov. Code 6250 et seq.), VTA will exempt from disclosure proprietary information, trade secrets and confidential commercial and financial information submitted in the proposal.

Any such proprietary information, trade secrets or confidential commercial and financial information that a Contractor believes should be exempted from disclosure shall be specifically identified and marked as such. 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.

Upon a request for records from a third party regarding the Contract, VTA will notify the Contractor in writing. The Contractor must respond within ten (10) days with the identification of any and all "proprietary, trade secret or confidential commercial or financial" information, and the Contractor shall indemnify VTA's defense costs associated with its refusal to produce such identified information; otherwise, the requested information may be released.

VTA shall employ sound business practices no less diligent than those used for VTA's own confidential information to proteet the confidence of all licensed technology, software, documentation, drawings, schematics, manuals, data and other information and material provided by the Contractor pursuant to the Contract that contain confidential commercial or financial information, trade secrets or proprietary information as defined in or pursuant to the California Public Records Act (Gov. Code 6250 et seq.) against disclosure of such information and material to third parties except as permitted by the Contract. The Contractor shall be responsible for ensuring that confidential commercial or financial information, trade secrets or proprietary information, with such determinations to be made by VTA at its sole discretion, bears appropriate notices relating to its confidential character.

During the performance of the Work under the Contract, it may be necessary for either party (the "Discloser") to make confidential information available to the other party (the "Recipient"). The Recipient agrees to use all such information solely for the performance of the Work under the Contract and to hold all such information in confidence and not to disclose same to any third party without the prior written consent of the Discloser. Likewise, the Recipient agrees that all information developed in connection with the Work under the Contract shall be used solely for the performance of the Work under the Contract, and shall be held in confidence and not disclosed to any third party without the prior written consent of the Discloser.

This Confidentiality section shall survive the termination or expiration of the Contract.

GC 9.11 Conflicts of Interest, Gratuities

No member, officer, or employee of VTA or of a local public body during his or her tenure, or one year thereafter, shall have any interest, direct or indirect, in this Contract or the proceeds thereof.

GC 9.11.1 Levine Act Statement

The Levine Act (Government Code Section 84308) is part of the Fair Political Practices Act. The Levine Act prohibits any elected or appointed officer, or alternate, of *VTA* from participating in or influencing the decision on awarding a contract with *VTA* to anyone who has contributed more than $250 to the officer within the previous twelve months. The Levine Act also requires an officer of *VTA* who has received such a contribution to disclose the contribution on the record of the proceeding. In addition, *VTA* officers are prohibited from soliciting or accepting a contribution of more than $250 from a party applying for a contract while the matter of awarding the contract is pending before *VTA* and for three months following the date a final decision concerning the contract has been made. A Proposer is prohibited from making a campaign contribution of more than $250 to a *VTA* officer while its Proposal is pending before *VTA* and for three (3) months following the date a final decision concerning the Proposal has been made.

Proposer must disclose on the reeord by completing the enclosed Form CER 9.3, entitled "Levine Act Statement" any contribution of more than $250 that they have made to any *VTA* Board Member or alternate within the twelve-month period preceding submission of its Proposal. This duty applies to your company, any member of your team, any agents for you or other team members and to the major shareholders of any closed corporation that is part of your team. If you check "yes" on the Levine Act Statement, indicating that you have

made a contribution that needs to be disclosed, you must include this information, specifying the date, amount and recipient of the contribution. This form must be submitted as part of the Administrative Submittal in the proposal.

GC 9.12 General Nondiscrimination Clause

In connection with the performance of Work 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 9.13 Amendment and Waiver

GC 9.13.1 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 VTA and Contractor, and specifically referencing this Contract.

GC 9.13.2 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 VTA 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 VTA.

GC 9.20 Survival

The following sections shall survive the nominal expiration or discharge of other Contract obligations, and VTA 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"
- "Confidential Information"
- "Parts Availability Guarantee"
- "Access to Records"
- "Training"

GC 10. Agency-Specific Provisions (Working Environment)

The Contractor shall ensure and maintain a working environment free of personnel harassment or intimidation. Conduct that creates an intimidating, hostile, or offensive work environment is prohibited. This includes but is not limited to the following:

- Verbal harassment, such as epithets, derogatory comments, offensive 'jokes', unwelcomed advances or slurs.
- Physical harassment, such as gestures, leering, impeding or blocking movement, or physical interference with normal work.
- Visual forms of harassment, such as derogatory or suggestive posters, graffiti, letters or drawings.
- Electronic forms of harassment, including sending suggestive e-mails, texts or photographs.
- Any more serious forms of offensive, threatening or hostile behavior.

It is the responsibility of the Contractor to:

- Inform its employees that behavior which creates an intimidating, hostile or offensive work environment is unacceptable,
- Create a working environment that is free from harassment,
- Take immediate corrective action, when informed, to stop behavior or conduct that VTA cites as prohibited or unacceptable.

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 the bus, the Contractor must begin Work within five (5) working days after receiving notification from VTA of failure of acceptance tests. VTA shall make the bus available to complete repairs timely with the Contractor repair schedule.

SP 1.1.2 Repairs by VTA

The Contractor shall provide, at its own expense, all spare parts, tools and space required to complete the repairs. At VTA's option, and at the Contractor's own expense, the Contractor may be required to remove the bus from VTA's property while repairs are being made. If the bus is removed from VTA'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.

VTA will not take responsibility to correct defects, except to replace defective parts as instructed by the Contractor.

1. **Parts used.** If VTA performs the repairs after non-acceptance of the bus, it shall correct or repair the defect 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 VTA 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 VTA after non-acceptance of the bus, then these parts shall be shipped prepaid to VTA.
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.** VTA shall be reimbursed by the Contractor for labor. The amount shall be determined by VTA for a qualified mechanic at a straight time wage rate of $100 /HR, which includes fringe benefits and overhead adjusted for VTA'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 VTA's service garage at the time the defect correction is made.
5. **Reimbursement for parts.** VTA 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 percent (15%) handling costs.

SP 1.2 Pilot Bus

The Contractor shall produce one pilot 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 VTA in accordance with the timing specified in section NR 1. In the event that noncompliance is identified, VTA shall to the extent practicable notify the Contractor of said noncompliance. As soon as practical after any issues are identified with the pilot bus, VTA shall issue a written report to the Contractor that advises the Contractor of the 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, VTA shall have the right to retain a portion of any 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 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, VTA may require all or a portion of the 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, VTA 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. See also Attachment A.

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.

The Contractor shall be required to perform first article inspections. A first article inspection shall include both a physical configuration inspection and a functional demonstration. First article inspections shall be conducted at the Contractor or subcontractor's facility by the designated agency representative. The Contractor shall furnish to VTA, prior to each first article inspection, in a written inspection and demonstration plan for each item for review. Contractor shall provide the complete inspection list to the VTA technical review group prior to the completion of the pilot bus. VTA's inspectors will attend each first article inspection unless VTA 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 VTA, and all documents relating to the inspection shall be forwarded to VTA.

SP 1.5 Post-Delivery Tests

VTA will conduct acceptance tests on each delivered bus. These tests shall be completed within Twenty (20) 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 VTA. 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. VTA 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.

"Post-Delivery Tests" shall include final testing and commission of the provided electric bus chargers. The chargers will be approved as a group. They will be tested with each bus as delivered in the order before final approval is issued. As the 1st charger is expected before the arrival of the pilot bus the 1st charger will be in service for several weeks before VTA will be able to issue final acceptance. VTA considers this a extend break in period, and as a part of the acceptance process expects the charger to function without issue during this period.

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 VTA's personnel with reimbursement by the Contractor.

SP 2. Deliveries

SP 2.1 Bus Delivery

Delivery of buses shall occur by signed receipt of VTA's designated agent(s) at the following point(s) of delivery: Santa Clara Valley Transit Authority (VTA, Cerone Yard), located at 3990 Zanker Rd, San Jose, CA 95134, and may be preceded by a cursory inspection of the bus.

VTA designates the maintenance supervisor or superintendent of the Overhaul and Repair facility at Cerone Yard as the designated receiving agent. Other receiving agents and/or locations may be assigned, as needed, by VTA (to be determined at VTA's sole discretion).

All coaches shall be delivered with a valid commercial vehicle weight certificate from the State of California. The certificate shall be valid for vehicle registration with the California Department of Motor Vehicles (DMV).

SP 2.2 Delivery Schedule

The buses shall be delivered at a rate not to exceed six (6) buses per week and not more than two (2) per day. Hours of delivery shall be 7:30 AM though 2:30 PM: Monday through Friday. See section NR 1 for delivery date details.

SP 2.3 Contract Deliverables

Contract deliverables associated with this Contract are set forth in the table below, along with other pertinent information. Contract deliverables shall be submitted in accordance with "Section 6: Technical Specifications." Due dates shown represent the last acceptable date for receipt of Contract deliverables. VTA 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		With proposal	Posted on official Altoona website	
2.	List of serialized units installed on each bus and all software, version and revision level	Review		With each delivered bus	Hardcopy	1 per bus
3.	Copy of Manufacturers' formal Quality Assurance Program	Review		Pre-award site visit	Hardcopy	1

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
4.	QA manufacturing certificate	Review		With each delivered bus	Hardcopy	1 per bus
5.	QA purchasing certifications acknowledging receipt of applicable specification	Review		With proposal	Per section NR3	Per NR3
6.	Pre-Delivery Bus Documentation Package	Review		With each delivered bus	Hardcopy	1 per bus
7.	Motor Vehicle Pollution Requirements Certificate	Review		With each bus	Hardcopy	1
8.	Pre-Production Meeting minutes	Approval		21 days after each meeting	Hardcopy	2 originals
9.	Driver's log and incident report	Review		With each bus delivery if drive-away service is used	Hardcopy	1 per bus
10.	Title documentation	Review		With each bus	Hardcopy	1 per bus
11.	Performance bond	Review		30 days following execution of Contract	Hardcopy	1
12.	Insurance certificates	Approval		With proposal	Per section NR3	Per NR3
13.	Engineering support	Review		During Pre-Production Meeting	Contracts	N/A
14.	Training instructor information	Approval		30 days prior to delivery of pilot bus		N/A
15.	Training curriculum	Approval		With proposal	Per section NR3	Per NR3
16.	Teaching materials	Review		During classroom instruction	Hardcopy	1
17.	Training classes videos	Review		30 days prior to first production bus	Electronic Media	10 each
18.	Final preventative maintenance manuals	Review		With Agency written approval, 30 days after delivery of first production bus	Hardcopy Electronic media	7 2
19.	Final Service procedures manuals	Review		With Agency written approval, 30 days after delivery of first production bus	Hardcopy Electronic media	7 2
20.	Final parts manuals	Approval		With Agency written approval, 60 days after delivery of first production bus	Hardcopy Electronic media	7 2
21.	Component repair manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With Agency written approval, 30 days after delivery of first production bus	Hardcopy Electronic media	7 2

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
22.	Draft preventative maintenance manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	Hardcopy Electronic media	2 1
23.	Draft diagnostic procedures manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	Hardcopy Electronic media	2 1
24.	Draft parts manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	Hardcopy Electronic media	2 1
25.	OEM component repair manuals	Approval		With pilot bus	Hardcopy	2
26.	Draft operators' manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With pilot bus	Hardcopy Electronic media	2 1
27.	Final operators' manuals	Review		Two copies with pilot bus, remaining with delivery of first production bus	Hardcopy	500
28.	Recommended spare parts list	Review		15 days prior to first bus of main delivery	Hardcopy	1
29.	Part number index	Approval		15 days prior to first bus of main delivery	Hardcopy Spreadsheet	1 1
30.	Current price list	Review		90 days after Agency written approval of draft parts manual	Hardcopy	7
31.	In-process drawings	Review		60 days prior to production	Scale drawings	1
32.	Electrical and air schematics	Review		With all other maintenance manuals above	Hardcopy Electronic media	7 1
33.	As-built drawings and complete set of Bill of Materials	Review		Within 30 days after final bus delivery	Electronic media	1
36.	Material samples	Review		By conclusion of Pre-Production Meetings		1
37.	Undercoating system program	Approval		First Pre-Production Meeting	Hardcopy	1
38.	Flooring certificate	Review		First Pre-Production Meeting	Certificate/ copy of purchase order	1

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
39.	Interior features -- fire-resistance certificates	Review		Prior to pilot bus completion	Certificates	1
40.	Crashworthiness	Review		Pre-award audit	Certificate and test results	1
41.	Technical review of electronic functionality	Approval		Prior to production	Hardcopy	1
42.	Interior security camera layout	Approval		Prior to pilot bus completion	Copies of interior views	1 each
43.	Technical review of power plant			Prior to production		
44.	Power plant certifications	Review		Prior to pilot bus completion	Hardcopy	1 each
45.	Paint layout	Approval		Prior to production	Hardcopy	1
46.	Resolution of issues "subject to Agency approval"	Approval		Prior to production	Hardcopy	1
47.	Exterior drawings	Review		First Pre-Production Meeting	Hardcopy Electronic media	3 1
48.	OEM software list	Review		Prior to production	Electronic media	1
49.	Special tools list and pricing breakdown	Review		With proposal	Per section NR3	Per NR3
50.	Warranty Bond	Review		At expiration of Performance Bond	Hardcopy	1
51.	List of Superior Warranties	Review		Prior to production	Hardcopy	1

SP 3. Options and Option Pricing

Section not used.

SP 4. Assignability of Options

Section not used.

SP 5. Payment

VTA shall pay and the Contractor shall accept the amounts set forth in the price schedule as full compensation for all costs and expenses of completing the Work in accordance with the Contract, including but not limited to all labor, equipment and material required; overhead; expenses; storage and shipping; risks and obligations; taxes (as applicable); fees and profit; and any unforeseen costs.

SP 5.1 Payment Terms

Payment upon Delivery with Retention

All payments shall be made as provided herein, less a retention of two percent (2%) plus any additional amount retained as provided below and less any amounts for liquidated damages in accordance with "Liquidated Damages for Late Delivery of the Bus."

VTA shall make payments for buses at the unit prices itemized in the price schedule within thirty (30) calendar days after the delivery and acceptance of each bus and receipt of a proper invoice.

VTA shall make payments for spare parts and/or equipment at the unit prices itemized in the price schedule within thirty (30) calendar days after the delivery and acceptance of said spare parts and/or equipment and receipt of a proper invoice.

VTA shall make a final payment for all retained funds within forty-five (45) calendar 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. Rectification of any deficiencies found during the acceptance of buses.
3. Contractor provision of any certifications as required by law and/or regulations.
4. Completion of post-delivery audits required under the Contract.

SP 5.2 Payment of Taxes

Unless otherwise provided in this Contract, the Contractor shall pay all federal, state and local taxes, and duties applicable to and assessable against any Work, goods, services, processes and operations incidental to or involved in the Contract, including but not limited to retail sales and use, transportation, export, import, business and special taxes. The Contractor is responsible for ascertaining and paying the taxes when due. The total Contract price shall include compensation for all taxes the Contractor is required to pay by laws in effect on the Proposal Due Date. At the present time, VTA asserts that the taxes applicable to this Contract are City of San Jose Sales Tax of 9.00%. The Contractor will maintain auditable records, subject to VTA reviews, confirming that tax payments are current at all times.

SP 6. Liquidated Damages for Late Delivery of the Bus

It is mutually understood and agreed by and between the parties to the Contract that time is of the essence with respect to the completion of the Work and that in case of any failure on the part of the Contractor to deliver the buses within the time specified in "Delivery Schedule, "except for any excusable delays as provided in "Excusable Delays/Force Majeure" as stated in GC 9.3 or any extension thereof, VTA will be damaged thereby. The amount of said damages, being difficult if not impossible of definite ascertainment and proof, it is hereby agreed that the amount of such damages due to VTA shall be the greater of the following two options:

- $200.00 per calendar day per bus not delivered by the delivery date as stated in the final Contraet in substantially good condition "as inspected by VTA" by the delivery date as specified in the Delivery Schedule, or

- $1,000.00 each day past the delivery date as stated in the final Contract.

The Contractor hereby agrees to pay the aforementioned amounts as fixed, agreed and liquidated damages, and not by way of penalty, to VTA and further authorizes VTA to deduct the amount of the damages from money due the Contractor under the Contract, computed as aforesaid. If the money due the Contractor is insufficient or no money is due the Contractor, then the Contractor shall pay VTA the difference or the entire amount, whichever may be the case, within thirty (30) days after receipt of a written demand by the Contract Administrator.

The payment of aforesaid fixed, agreed and liquidated damages shall be in lieu of any damages for any loss of profit, loss of revenue, loss of use, or for any other direct, indirect, special or consequential losses or damages of any kind whatsoever that may be suffered by VTA arising at any time from the failure of the Contractor to fulfill the obligations referenced in this clause in a timely manner.

SP 7. Service and Parts

SP 7.1 Contractor Service and Parts Support

The Contractor shall state on the form Contractor Service and Parts Support Data the representatives responsible for assisting VTA, 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 7.2 Documentation

The Contractor shall provide an electronic copy and seven (7) printed current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, and five hundred (500) 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.

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:

- General information and specifications.
- A complete, well-developed troubleshooting guide covering all the mechanical, electrical, and electronic components.
- All preventive maintenance, lubrication, and adjustment requirements.
- Complete wiring and schematic diagrams and schedules for wire and cable sizes and ratings including actual cable and connector lay-out, plus locations in the bus of all electrical and electronic components. Schematics to included connector pin identification for every connector with associated circuit identifier for every electrical connector on the vehicle. Designed amperage draw of each electrical component is to be shown on the schematics. Each individual drawing of the schematics shall have a consistent number/letter locator system on the drawing perimeter. Circuits that are continued from one schematic drawing to another shall be cross referenced with drawing identifications or descriptions. Where practical, the most common electrical circuits shall be shown on individual drawings, i.e. the start circuit, the system shutdown circuit, the door control circuit. Etc.

Copies of the Electric drive and ESS manufacturers' schematics are to be included in the OEM schematic manuals.

- Illustrative drawings, such as isometrics, exploded views or photographs identifying components in relationship to each other as mounted in the buses.
- Components shown in exploded views with all parts clearly identified including Contractor part number.
- Rebuilding procedures for all rebuild-able components.
- Detailed, well-illustrated procedures for component change-out plus servicing, adjusting, testing and run-in information as required.
- Body and structural information and material specifications for major accident repairs.
- Seating and stanchion layouts and window diagrams.
- Repair and calibration instructions and values.
- Comprehensive listing of all software and firmware for all electronic control modules, list to include software revision level, release date, and all optional parameter settings as setup by the Contractor.
- List of special test equipment/tools required to maintain and repair systems down to the component level.

In addition to the maintenance manuals, the Contractor shall provide an equal number of 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. Drive system service, troubleshooting, and overhaul manuals.
5. Energy Storage System (ESS) 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 propeller 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.

The Contractor shall also furnish and update seven (7) sets of published price lists of parts included in the respective coach service and parts manuals.

The Contractor shall also provide an electronic list of all parts listed in the provided final version of the parts manuals. This list shall include the OEM part number, parts description, parts manual page reference, and item number from the parts manual.

Contractor shall provide updates to the manuals, and shall keep manuals and detail parts drawings for these coaches available and up to date for a period of fifteen (15) years after coach acceptance at no cost to VTA. Two (2) sets of parts and maintenance manuals shall be provided to VTA in electronic format (preferably CD-ROM), in PDF, or other industry standard format, subject to approval by VTA.

Contractor will provide listing of component serial numbers for each coach.

Components to be included are:

Drive Unit	A/C system	Lo-Voltage converter	Steering Gear Box
Ground Fault	Air compressor	ESS	Destination Sign
Front Axle	Camera system	Radiator	Water Pump
Rear Axle	Drive Invertors	Ramp	Fan Drive
Hubodometer	A/c boost pump	Surveillance System	I/O modules & system
APC system			

Contractor shall provide one (1) electronic and two (2) sets of hard copies of the operators, parts, and maintenance manuals on or before the day that the 1st coach is delivered VTA. These manuals are to be preliminary copies of the final versions listed above, and to be clearly marked as such. They are to be as accurate as is feasible at the time of delivery. They are to be used by VTA personal to familiarize themselves with the coach, and its sub-systems.

Except for the bus parts manual, all other required manuals, in finalized form, shall be delivered no later than thirty (30) days after delivery of the first coach of each phase of delivery. The Contractor shall provide detailed parts drawings to the VTA upon request. Bus parts manuals, in final form, shall arrive no later than sixty (60) days after delivery of the first bus. The Contractor shall provide detailed engineering parts drawings to VTA upon request.

Fifteen (15) days prior to first bus of main delivery, the Contractor shall furnish a list of recommended spare parts, broken down to the level of line replaceable units. The parts list shall provide part numbers, descriptions, recommended quantities, and not-to-exceed unit prices for listed parts.

The Contractor shall provide to VTA a minimum of three (3) sets of blueprints, per bus size, showing front, sides, and rear (exterior) to be used to determine exact location of exterior and interior signs and numbers. One (1) set shall be reproducible by VTA internal use only in the event of future evaluations and decisions regarding exterior appearance of VTA's buses.

The Contractor shall provide one (1) electronic copy of the exterior sides of the bus in a editable file format that is vector supported for scaling. Preference will be given to contractors that can also provide a complete 3D exterior model in an editable format.

SP 7.3 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 fifteen (15) 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 VTA 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 VTA, within eight (8) hours of VTA's verbal or written request, the original Suppliers' and/or manufacturers' parts numbers, company names, addresses, telephone numbers and contact persons' names for all of the specific parts not received by VTA.

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

SP 7.4 Agency-Furnished Property

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

VTA 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 VTA, detailing the facts, and at VTA's expense repair, modify, return or take such other action as directed by VTA. The parties may conduct a joint inspection of the property before the Contractor takes possession to document its condition.

VTA retains title to all Agency-furnished property. Upon receipt of VTA-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 VTA. 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, VTA shall have the right to take corrective measures itself and deduct the cost from any sums owed to the Contractor.

Warranty administration and enforcement for Agency-furnished equipment are the responsibility of VTA, unless the parties agree to transfer warranty responsibility to the Contractor.

SP 8. Federal Motor Vehicle Safety Standards (FMVSS)

The Contractor shall submit one (1) 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 9. Insurance

The Contractor shall maintain in effect during the term of this Contract, including any warranty period, at its own expense, at least the following coverage and limits of insurance:

- Statutory Workers Compensation and Employers Liability insurance and/or qualified self-insurance program covering Supplier's employees while on Agency property.
- Commercial General Liability Insurance:
- Bodily Injury and Property Damage, including Contractual Liability covering the indemnification contained herein, $10,000,000 combined single limits per occurrence, $10,000,000 aggregate, where applicable.

- Product liability: $5,000,000 per occurrence, for a period of five (5) years after acceptance of the last bus delivered under this Contract (Products Liability coverage may be effected through one or more excess liability policies).
- Automobile Liability Insurance: Bodily Injury and Property Damage, $2,000,000 combined single limits per occurrence.

Contractor shall deliver to VTA, within ten (10) days after receiving Notice of Award of this Contract, evidence of the above. Prior to the expiration of any insurance during the time required, the Supplier shall furnish evidence of renewal to VTA's Contract Administrator.

All the Contractor's policies shall contain an endorsement naming VTA as an additional insured and providing that written notice shall be given to VTA'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.

- **Minimum Limits of Insurance** - Contractor shall maintain limits no less than:
  1. Commercial General Liability Insurance: Bodily Injury and Property Damage, including Contractual Liability covering the indemnification contained herein, $10,000,000 combined single limits per occurrence, $10,000,000 aggregate, where applicable.
  2. Product liability: $5,000,000 per occurrence, for a period of five (5) years after acceptance of the last bus delivered under this Contract (Products Liability coverage may be effected through one or more excess liability policies).
  3. Automobile Liability: $2,000,000 combined single limit per accident for bodily injury and property damage.
  4. Workers' Compensation and Employers Liability: Statutory Workers' Compensation limits and Employers Liability limits of $2,000,000 per accident.

- **Self-Insured Retentions** - Any self-insured retentions in excess of $25,000 must be declared to and approved by the "VTA." At the option of the "VTA," either: (i) the insurer shall reduce or eliminate such self-insured retentions as respects the "VTA," its officers, officials, employees and volunteers; or (ii) the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration, and defense expenses.

- **Other Provisions** – General Liability and Automobile Liability
  a. VTA, its officers, officials, employees and volunteers are to be covered as insured's as respects: liability arising out of activities performed by or on behalf of the Contractor, including VTA's general supervision of the Contractor; products and completed operations of the Contractor and its subcontractors; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to VTA, its officers, officials, employees or volunteers.
  b. The contractor's insurance coverage shall be primary insurance as respects VTA, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by VTA, its officers, officials, employees or volunteers shall be in excess of the contractor's insurance and shall not contribute to it.
  c. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to VTA, its officers, officials, employees, or volunteers.
  d. The Contractor's insurance shall apply separately to each insured against whom the claim is made or suit is brought, except with respect to the limits of the insurer's liability

e. Workers' Compensation and Employers Liability – The insurer shall agree to waive all rights of subrogation against VTA, its officers, officials, employees, and volunteers for losses arising from work performed by the Contractor and its subcontractors for VTA.

- **Acceptability of Insurers** - Insurance and bonds are to be placed with insurers with a Best's rating of no less than B+VIII, unless specific prior written approval has been granted by the "VTA".

- **Certificates of Insurance** - Contractor shall furnish to "VTA" the certificates of insurance evidencing the coverages specified above. The certificates for each insurance policy are to be signed by an authorized representative of that insurer. The certificates will be issued on a standard ACORD Form or something substantially similar thereto. The certificates will (1) identify the underwriters, the types of insurance, the insurance limits and the policy term and (2) in the "Certificate Holder" box include:

  VTA
  Contracts Office- Contract VTA-12-007-P16
  3331 North First Street, Building A
  San Jose, CA 95134-1906

  All certificates are to be received and approved by VTA before work commences. VTA reserves the right to require complete, certified copies of all required insurance policies, at any time.

  Each insurance policy required by this Contract shall provide that if the policy is canceled or coverage reduced, such cancellation or reduction shall not be effective for thirty (30) days, except for non-payment of premium which shall be ten (10) days, after receipt by VTA of written notice of such cancellation or reduction. The notice of cancellation or reduction must be without any qualifications such as "will endeavor to" etc.

- **Subcontractors** - Contractor shall include these insurance requirements in all subcontracts and require all of its subcontractors to obtain and maintain the specified insurances. All coverage for subcontractors shall be subject to all of the requirements stated herein.

SP 10. Source Code Escrow

Upon execution of the Contract, the Contractor shall provide VTA a list of: (i) all of Contractor's software used in and for the buses; and (ii) all OEM software comprising proprietary works ("Proprietary Software") for all vehicle subsystems and components provided by third parties ("Subsystem Suppliers") to Contractor. Contractor shall deposit, or cause to be deposited (in a separate account for itself and a separate account for each Subsystem Supplier):

(i) All source code, flow charts, drawings, communications messaging lists, build instructions, software tools, and any other documents or materials comprising the Proprietary Software or needed for compiling, building, operating, and maintaining the Proprietary Software; and

(ii) Code for updates and upgrades to the Proprietary Software to which VTA is entitled (hereafter items listed in (i) and (ii) are collectively referred to as "Deposit Materials"). These Deposit Materials must be deposited with a source code escrow provider; such as, Iron Mountain, NCC Group, or a source code escrow company with equivalent or better history of performance,

verification capabilities, and stability as these providers ("Source Code Escrow Provider") under a source code escrow agreement ("Source Code Escrow Agreement") entered into by the Contractor, Subsystem Supplier, VTA, and the Source Code Escrow Provider, under which VTA is a beneficiary (recipient of Deposit Materials). Contactor shall pay the Source Code Escrow Provider for the Source Code Escrow Provider's services.

The basic terms of said Source Code Escrow Agreement shall, at a minimum, include the following:

A. In the event of any one of the following conditions ("Release Conditions"), the Source Code Escrow Provider, upon receipt of written notice from VTA, shall turn over to VTA all Deposit Materials in its possession promptly from the date of receipt of the notice:

A Subsystem Supplier: (i) has sought protection under bankruptcy laws or is the subject of an involuntary bankruptcy; (ii) becomes insolvent; or (iii) otherwise plans to liquidate its assets and conclude its business affairs;

Failure of a Subsystem Supplier to function as a going concern or operate in the ordinary course; Contractor's or a Subsystem Supplier's material breach of a software license agreement (e.g., End User License Agreement) pursuant to the Contract that affects the usability or performance of the subsystem software which is provided to VTA; or

If a Subsystem Supplier ceases to produce or maintain the subcomponent as a general matter to its customers.

B. If, as a result of the occurrence of a Release Condition, the Deposit Materials are released to VTA, VTA shall have all rights and license to use, or allow any other party to use, the Deposit Materials solely for VTA Purposes. Other than agents and contractors of VTA, VTA will not allow any third party to have access to the Deposit Materials.

C. Source Code Escrow Provider shall: (i) perform verification of the Deposit Materials; and (ii) provide reporting of this verification, the tasks performed, and the results, including at a minimum:

a) Review and confirmation that all materials to be deposited are present (pursuant to Depositor's answers to escrow deposit questionnaire); analysis and testing to confirm that Deposit Materials are accessible if released, including virus scan, media readability test, compression test, password and encryption test, source code and source code information test, as well as listing of all files and file classifications; and

b) Perform an analysis and inventory of the Deposit Materials, which identifies whether the build, setup, and design documentation, and identifying materials required to recreate the Depositor's application development and production environments are present or not and whether they apply to the Deposit Materials. The Source Code Escrow Provider shall also provide a report that includes compile and setup documentation, file classification tables and file listings, and any required software development materials, including, without limitation, required source code languages and compilers, third party utilities and software, libraries, operating systems, and hardware, and Source Code Escrow Provider's analysis of the deposit.

D. VTA shall have the option to request additional verification of the Deposit Materials that may include a full build out of the software using the deposited materials, in whole or in part, by Source Code Escrow Provider or a third party consultant.

E. VTA shall have the option to become the paying party of the Source Code Escrow Agreement should Contractor become unable to pay or cease making payments to the Source Code Escrow Provider.

F. Contractor shall deposit all Deposit Materials within 7 business days of execution of the Contract.

SP 11. Sustainability

VTA recognizes that being sustainable (environmentally, economically and socially responsible) involves everyone, both internal and external to VTA. VTA 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, utilizing energy-efficient and non-polluting vehicles, equipment and processes, and ensuring employee awareness of sustainability initiatives.

VTA has a sustainability policy that includes the responsibility to make sure all of its Contractors are informed of this policy. The Contractor will provide VTA with a statement indicating that responsible parties have read and understand VTA'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 VTA with a copy of its corporate sustainability policy.

SP 12. Agency-Specific Provisions

SP 12.1 Working Environment:

The contractor shall ensure and maintain a working environment free of personnel harassment or intimidation. Conduct that creates an intimidating, hostile, or offensive work environment is prohibited. This includes but is not limited to the following:

- Verbal harassment, such as epithets, derogatory comments, offensive 'jokes', unwelcomed advances or slurs.
- Physical harassment, such as gestures, leering, impeding or blocking movement, or physical interference with normal work.
- Visual forms of harassment, such as derogatory or suggestive posters, graffiti, letters or drawings.
- Electronic forms of harassment, including sending suggestive e-mails, texts or photographs.
- Any more serious forms of offensive, threatening or hostile behavior.

It is the responsibility of the contractor to:

- Inform their employees that behavior which creates an intimidating, hostile or offensive work environment is unacceptable,
- Create a working environment that is free from harassment,
- Take immediate corrective action, when informed, to stop behavior or conduct that VTA cites as prohibited or unacceptable.

SP 12.2 Patent Infringement:

VTA shall advise the Contractor of any impending patent suit related to this Contract against VTA and provide all information available. The Contractor shall defend any suit or proceeding brought against VTA based on a claim that any equipment, or any part thereof, furnished under this Contract constitutes an infringement of any patent, and the Contractor shall pay all damages and costs awarded therein, excluding incidental and consequential damages, against VTA. In case said equipment, or any part thereof, is in such suit held to constitute infringement and use of said equipment or parts is enjoined, the Contractor shall, at its own expense and at its option, either procure for VTA the right to continue using said equipment or part, or replace same with non-infringing equipment, or modify it so it becomes non-infringing.

Contractor's obligations under this section are discharged and VTA shall hold Contractor harmless with respect to the equipment or part if it was specified by VTA and all requests for substitutes were rejected, and the Contractor advised VTA under "Questions, Clarifications and Omissions" (Section IP 6) of a potential infringement, in which case the Contractor shall be held harmless.

SP 12.3 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. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "subject data" does not include financial reports, cost analyses, and similar information incidental to Contract administration.

VTA 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.

SP 12.4 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 twelve (12) 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 VTA, 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:

SP 12.4.1 Local Governments

In accordance with 49 CFR 18.36(i), the Contractor agrees to provide VTA, 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.

SP 12.4.2 State Governments

In accordance with 49 CFR 633.17, the Contractor agrees to provide VTA, 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.

SECTION 5: FEDERAL REQUIREMENTS

POLICIES FOR ALL TIERS

Contractor agrees to comply with Section's FR 1-FR 17 and to include these requirements in all subcontracts of every tier.

FR 1. Access to Records

(See above SP 12.4 in Special Provisions)

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 agreement. The Contractor shall not perform any act, fail to perform any act or refuse to comply with any VTA requests that would cause VTA 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. Recycled Products

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

FR 5. Civil Rights Requirements

The following requirements apply to the underlying 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 Project. The Contractor agrees to take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, the Contractor agrees to comply with any implementing requirements FTA may issue.

(b) **Age:** In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 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 6. No Government Obligation to Third Parties

1. VTA 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 VTA, 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 7. 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 this Project. Upon execution of the underlying Contract, the Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or 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 8. Suspension and Debarment

This Contract is a covered transaction for purposes of 2 CFR Parts 180 and 1200. As such, the contractor is required to verify that none of the contractor, its principals, as defined at 2 CFR 180.995, or affiliates, as defined at 2 CFR Part 180.905, are excluded or disqualified as defined at 2 CFR 180.940 and 180.945.

The Contractor is required to comply with 2 CFR, Subpart C and must include the requirement to comply with 2 CFR, Subpart C in any lower tier covered transaction it enters into.

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

> The certification in this clause is a material representation of fact relied upon by VTA. If it is later determined that the Proposer knowingly rendered an erroneous certification, in addition to remedies available to VTA, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment. The Proposer agrees to comply with the requirements of 2 CFR, Subpart C while this offer is valid and throughout the period of any Contract that may arise from this offer. The Proposer further agrees to include a provision requiring such compliance in its lower tier covered transactions.

FR 9. 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 VTA deems appropriate. Each subcontract the Contractor signs with a Subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

FR 10. 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 VTA and understands and agrees that VTA 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. 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 VTA and understands and agrees that VTA 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 12. 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 13. 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 the required domestic content percent, as specified in 49 USC 5323(j)(2)(C) and 49 CFR 661.11 and the FAST Act. See also Federal Register Vol. 81 No. 170 (Published September 1, 2016).

A Bidder or Proposer must submit to VTA the appropriate Buy America Certification with all offers on FTA-funded contracts, except those subject to a general waiver. Proposal 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 14. Testing of New Bus Models

The Contractor agrees to comply with: (i) 49 USC 5318, as amended by the Fixing America's Surface Transportation Act (FAST Act) and Section 20014 Moving Ahead for Progress in the 21st Century Act (MAP -21); and (ii) FTA's implementing regulation at 49 CFR Part 665. See also Federal Register Vol. 81, No. 147 (Published August 1, 2016).

The Contractor shall perform, at a minimum, the following, but VTA's failure to list any applicable regulations does not relieve Contractor of its obligation to comply with all applicable governing statutes and regulations, including official interpretations.

1. A manufacturer of a new bus model or a bus produced with a major change in components or configuration shall provide a copy of the final test report to the recipient at a point in the procurement process specified by the recipient, which will be prior to the recipient's final acceptance of the first vehicle.
2. A manufacturer who releases a report under Paragraph 1 above shall provide notice to the operator of the testing facility that the report is available to the public.

3. If the manufacturer represents that the vehicle was previously tested, the vehicle being sold should have the identical configuration and major components as the vehicle in the test report, which must be provided to the recipient prior to recipient's final acceptance of the first vehicle. If the configuration or components are not identical, the manufacturer shall provide a description of the change and the manufacturer's basis for concluding that it is not a major change requiring additional testing.
4. If the manufacturer represents that the vehicle is "grandfathered" (has been used in mass transit service in the United States before October 1, 1988, and is currently being produced without a major change in configuration or components), the manufacturer shall provide the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.
5. Establish testing procedures and establish minimum performance standards, which are generally based upon the pre-MAP-21 tests, and a pass/fail scoring system for new bus models, with a minimum passing score of 60 points. A bus model could receive up to an additional 40 points based on its performance above the proposed minimum performance standard in particular test categories. Buses would need to achieve at least a minimum score in each category in order to pass the overall test and be eligible for procurement using FTA financial assistance.

FR 15. 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 proposal 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 16. 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, "on-board" commercial ocean bill of lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the FTA recipient (through the Contractor in the case of a Subcontractor's bill-of-lading.)
- 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 17. 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 18. Policies for Selected Contracts

Contractor shall comply with the subsections of this Section FR 18 and to include these requirements, except "Contract Work Hours and Safety Standards Act" (Section 18.1), in all subcontracts exceeding $100,000 in value of every tier. Contractor will include "Contract Work Hours and Safety Standards Act" (Section 18.1) in all subcontracts exceeding $2,500 in value not including subcontracts for the purchase of supplies or materials or articles ordinarily available on the open market.

FR 18.1 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 VTA 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.
5. **Payrolls and basic records:** (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

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. VTA 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.

Battery Compartment: Low-voltage energy storage, i.e. 12/24 VDC batteries.

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.

Beltless Alternator: See Solid State Alternator.

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

CARB: California Air Resources Board.

CHP: California Highway Patrol.

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

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.

Cells: Individual components (i.e., battery or capacitor cells).

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

Code: A legal requirement.

Combination Gas Relief Device: A relief device that is activated by a combination of high pressures or high temperatures, acting either independently or together.

Composite Container for CNG: A container fabricated of two or more materials that interact to facilitate the container design criteria.

Compressed Natural Gas (CNG): Mixtures of hydrocarbon gases and vapors consisting principally of methane in gaseous form that has been compressed for use as a vehicular fuel.

Container: A pressure vessel, cylinder or cylinders permanently manifolded together, used to store CNG.

Container Appurtenances: Devices connected to container openings for safety, control or operating purposes.

Container Valve: A valve connected directly to a container outlet.

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. In a completely battery electric bus this typically converts High Voltage from the drive train battery system to 28 VDC in lieu of a conventional engine driven alternator.

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 VTA.

Defueling: The process of removing fuel from a tank.

Defueling Port: Device that allows for vehicle defueling, or the point at which this occurs.

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.

DPF: Diesel particulate filter.

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

Drive System Controller (HSC): Regulates energy flow throughout electric drive 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.

Drive System (HDS): The mechanical and/or electromechanical components, traction motors and energy storage system, which comprise the traction drive portion of the propulsion system.

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):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.

Fill Pressure for CNG: The pressure attained at the actual time of filling. Fill pressure varies according to the gas temperatures in the container, which are dependent on the charging parameters and the ambient conditions. The maximum dispensed pressure shall not exceed 125 percent of service pressure.

Flow Capacity: For natural gas flow, this is the capacity in volume per unit time (normal cubic meters/minute or standard cubic feet per minute) discharged at the required flow rating pressure.

Fuel Line: The pipe, tubing or hose on a vehicle, including all related fittings, through which natural gas passes.

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

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.

Fuel Management System: Natural gas fuel system components that control or contribute to engine air fuel mixing and metering, and the ignition and combustion of a given air-fuel mixture. The fuel management system would include, but is not limited to, reducer/regulator valves, fuel metering equipment (e.g. carburetor, injectors), sensors (e.g., main throttle, wastegate).

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.

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.

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

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 Pressure: Those portions of the CNG fuel system that see full container or cylinder pressure.

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

Hose: Flexible line.

Hybrid: A vehicle that uses two or more distinct power sources to propel the vehicle.

Intermediate Pressure: The portion of a CNG system after the first pressure regulator, but before the engine pressure regulator. Intermediate pressure on a CNG vehicle is generally from 3.5 to 0.5 MPa (510 to 70 psi).

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

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.

Liner: Inner gas-tight container or gas container to which the overwrap is applied.

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).

Lower Explosive Limit: The lowest concentration of gas where, given an ignition source, combustion is possible.

Maintenance Personnel Skill Levels: Defined below are maintenance personnel skill levels used in the Technical Specifications.

(a) 5M - Foreman
(b) 4M - Transit Mechanic
(c) 3M – (None Currently at VTA)
(d) 2M - Service Mechanic
(e) 1M - Service Worker (fueler/cleaner)

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.

Minimum Standard Operating State of Charge. The minimum design operating state of charge as specified 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.

Metering Valve: A valve intended to control the rate of flow of natural gas.

Module: An assembly of individual components

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.

Operating Pressure: The varying pressure developed in a container during service.

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.

Pipe: Nonflexible line.

Pressure Relief Device (PRD): A pressure and/or temperature activated device used to vent the container/cylinder contents and thereby prevent rupture of an NGV fuel container/cylinder, when subjected to a standard fire test as required by fuel container/cylinder standards. Standards include but are not limited to ASTM F1508, ASTM F1565, ASTM F1685, and ASTM F1370.

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, as applicable, engine, hybrid drive system, traction motors, the hybrid drive system,(HDS), energy storage system (ESS), and system controllers including all wiring and converter/inverter.

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.

Rejectable Damage: In terms of NGV fuel containers/cylinders, this is damage as outlined in CGA C-6.4, "Methods for External Visual Inspection of Natural Gas Vehicle Fuel Containers and Their Installations," and in agreement with the manufacturer's recommendations.

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: 150lbs for every designed passenger seating position and for the driver.

SLW (Seated Load Weight): 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.

Service Pressure: The settled pressure at a uniform gas temperature of 21°C (70°F) and full gas content. It is the pressure for which the equipment has been constructed, under normal conditions. Also referred to as the nominal service pressure or working pressure.

Settled Pressure: The gas pressure when a given settled temperature, usually 21°C (70°F), is reached.

Settled Temperature: The uniform gas temperature after any change in temperature caused by filling has dissipated.

Solid State Alternator: A module that converts high-voltage DC to low-voltage DC (typically 12/24 V systems).

Sources of Ignition: Devices or equipment that because of their modes of use or operation, are capable of providing sufficient thermal energy to ignite flammable compressed natural gas-air mixtures when introdueed into such a mixture, or when such a mixture comes into contact with them.

Special Tools: Tools not normally stocked by VTA.

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.

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 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.

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.

Thermally Activated Gas Relief Device: A relief device that is activated by high temperatures and generally contains a fusible material.

Unladed Weight: Per State of California definition for determining weight fees, the unladen weight is the same as the curb weight defined above, except for 5 gallons of fuel in place of maximum fuel

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 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.

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 lbs. when occupied.

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 APTA issuance of this specification.

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 VTA 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.

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 the Agency and (2) be considered as a retrofit (if possible) to any previous bus(es) manufactured or assembled. Any such changes must be approved by the Agency in accordance with the communication requirements of this RFP.

The 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.

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. The maximum loaded vehicle weight shall comply with California state law, AB 1250.

Buses at a capacity load shall not exceed the tire factor limits, brake test criteria or structural design criteria.

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 twelve (12) years or 500,000 miles. It shall be capable of operating at least 40,000 miles per year, including the 12th year.

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

TS 5.4 Maintenance and Inspection

Scheduled maintenance tasks shall be related and shall be in accordance with the manufacturer's recommended preventative maintenance schedule (along with routine daily service performed during the charging operations).

Scheduled maintenance tasks shall be related and shall be grouped in maximum mileage intervals. Based upon the Design Operating Profile defined in Section TS 8, routine scheduled maintenance actions, such as filter replacement and adjustments shall not be required at intervals of less than 6,000 miles, except for routine daily service performed during the charging operations. Higher levels of scheduled maintenance tasks shall occur at even multiples of the mileage for lower level tasks.

Test ports, as required, shall be provided for commonly checked functions on the bus, such as air intake, exhaust, hydraulic, pneumatic, charge-air, cooling systems all system voltages, currents, & ESS SOC.

The coach manufacturer shall give prime consideration to the routine problems of maintaining the vehicle. All coach components and systems, both mechanical and electrical, which will require periodic physical Work or inspection processes shall be installed so that a minimum amount of time is consumed in gaining access to the critical repair areas. Each coach shall be designed such that it shall not be necessary to disassemble portions of the coach structure and/or equipment such as seats and flooring under seats in order to gain access to these areas. Each coach 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 coach 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.

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

TS 5.5 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 VTA and obtain VTA'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 5.6 Training

The Contractor will provide maintenance training utilizing three modules of instruction: General Orientation; Technical Orientation; and Stand-Alone Courses. There will be a total of 42 days of training provided, consisting of 1 day of technical orientation described below, 15 days of technical training described below, and 11 days of ESS overhaul, drive system overhaul and destination sign overhaul training, as described under Stand Alone System Specific Courses, and 15 days of train the trainer programs. For the purposes of this Training section, one "day" refers to a minimum of [8] hours of training.

GENERAL ORIENTATION

Instructor and Educational Program:
The Contractor shall have at least one (1) qualified instructor who shall be available at VTA's property, as needed (to be determined at VTA's sole discretion), to comply with the training class requirements. The Contractor shall provide an Educational Program for VTA Maintenance personnel to assure satisfactory use, servicing and maintenance of the equipment to be furnished.

The Educational Program shall include instruction, instructional materials, and training aids, targeted for specific groups of Vehicle Maintenance personnel. The timing of the maintenance training, delivery of the specified training aids and equipment, and composition of the training groups will be determined by VTA Maintenance Training Center (MTC).

The Contractor shall not assume any knowledge of the features of the vehicle on the part of VTA personnel and shall design the program to educate VTA personnel to a level that permits safe, knowledgeable, and complete maintenance of the vehicle. It may be assumed that maintenance personnel have the basic skills pertinent to their crafts.

All training will be conducted according to a schedule determined by a VTA Training Coordinator and coordinated with the Contractor. The Contractor will provide an initial orientation for maintenance personnel only. The General Orientation will be provided at three (3) VTA bus maintenance facilities and may, at the discretion of VTA, be provided on more than one shift. The orientation will be repeated until all available mechanics have received the orientation (approximately three presentations per facility). The orientation will be presented on and around the bus. The audience size will be approximately 15 VTA staff members per session. The orientation session will be from three to four hours in duration and shall include, but not be limited to, the following:

- Overview of vehicle's systems
- Component location and general function
- Bus operation and controls
- Servicing and inspection

The target population for this training is 270 maintenance and service personnel.

TECHNICAL ORIENTATION

The Contractor shall provide a structured program of technical training consisting of forty (40) class hours to a maximum class size of twelve (12) mechanics to be delivered three (3) times at one of three VTA maintenance facilities. VTA expects that all 5 buses be stationed at one yard, therefore only one set of training will be required. The training will consist of specific and identifiable separate areas of instruction concerning, at a minimum, the following:

- Electrical, Electronic, and Programmable Logic Controller Systems (if selected by VTA)
- Energy storage System
- Electric drive System
- Heating, Ventilation & Air Conditioning
- Air and Brake System, including ABS & ATC
- Suspension & Steering & Axles
- Wheelchair Ramp
- Destination Sign and Annunciator
- Door and door controls including CLASS system if equipped.
- Use of all OEM & Contractor special purpose tools and diagnostic equipment

The target population is 36 mechanic personnel.

TECHNICAL TRAINING

1. Electrical system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate problems. Hands on exercises with the actual electrical and electronic systems on a bus will reinforce troubleshooting procedures. This will include instruction in the Programmable Logic Controllers to include but not be limited to:

- Introduction to PLCs
- Diagnostics and Troubleshooting of PLCs
- Programming the PLC

The target population is 36 mechanic personnel.

The contractor will provide suitable training aids, books, manuals, and publications covering the electrical and electronic systems which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

2. The Energy Storage system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate the problem. Hands on exercises with the actual ESS on a bus will reinforce troubleshooting procedures. Training must also include maintenance requirements for the specified ESS cooling system covering performance parameters and maintenance testing procedures for the multi-fan arrangement.

The contractor will provide suitable training aids, books, manuals, and publications covering the Drive and ESS system, which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

3. The electric drive system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate the problem. It shall also include training in troubleshooting and repairing the Vanner beltless alternator or approved equal system. Hands on exercises with the actual Electric drive system on a bus will reinforce troubleshooting procedures. Training must include introduction to the 3-phase A/C electric drive function and design.

   The contractor will provide suitable training aids, books, manuals, and publications covering the Electric drive system, which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

4. Heating, ventilation and air conditioning system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. If AC is supplied on the buses, the training will be to the level of certification. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate problems. Hands on exercises with the actual HVAC system on a bus will reinforce troubleshooting procedures.

   The contractor will provide suitable training aids, books, manuals, and publications covering the HVAC system that will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

5. Air system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate problems. Hands on exercises with the actual air system on a bus will reinforce troubleshooting procedures.

   The contractor will provide suitable training aids, books, manuals, and publications covering the air system, which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

6. Door system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate problems. Hands on exercises with the actual door system on a bus will reinforce troubleshooting procedures. Training must emphasize adjustment techniques for the large door panels (50" minimum door opening) to assure full closure at high vehicle speeds, correct door opening speeds, and cushioning at full open to prevent 'slamming'. Training must also emphasize correct adjustment of the activation system for the specified automatic door opening system (CLASS or approved equal).

   The contractor will provide suitable training aids, books, manuals, and publications covering the door system, which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

7. The brake system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate the problem. Hands on exercises with the actual brake system on a bus will reinforce troubleshooting procedures.

   The contractor will provide suitable training aids, books, manuals, and publications covering the brake system which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

8. Suspension, steering, and axle system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate the problem. Hands on exercises with the actual suspension, steering, and axle systems on a bus will reinforce troubleshooting procedures.

   The contractor will provide suitable training aids, books, manuals, and publications covering the suspension, steering, and axle systems which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

9. Wheelchair ramp system instruction will cover the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate the problem. Hands on exercises with the actual wheelchair lift system on a bus will reinforce troubleshooting procedures.

   The contractor will provide suitable training aids, books, manuals, and publications covering the wheelchair ramp system which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

10. Fire Suppression System instruction will cover preventative maintenance and the major failure events experienced in the system, and how to recognize the failure signs through troubleshooting with test equipment. Students will be given failure/trouble parameters and shown step by step troubleshooting procedures to isolate the problem. Hands on exercises with the actual fire suppression system on a bus will reinforce troubleshooting procedures. Training will be to the level of certification, to allow VTA staff to recharge the system.

    The contractor will provide suitable training aids, books, manuals, and publications covering the wheelchair ramp system which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

STAND-ALONE COURSES:

The contractor will provide the following standalone system specific courses:

- Electronic Destination Sign System
- ESS Overhaul
- Electric drive Overhaul

a. Electronic Destination Sign System: This will be a course of not less than eight (8) hours wherein the electronic sign and annunciator system will be explained at a component level for electronic technicians. This course will be conducted at VTA Maintenance Training Center. Delivery: Three times, to a class size of ten (10) as coordinated by VTA.

   The contractor will provide suitable training aids, books, manuals, and publications covering the electronic destination sign system which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

b. Overhaul of the ESS: This will be a course of not less than 40 hours wherein the ESS will be taken through the overhaul and test procedures. This course will be conducted at the Cerone Overhaul and Repair Facility or the OEM training facility. Delivery: Once, to a class size of approximately seven (7) maintenance personnel, as coordinated by VTA.

   The contractor will provide suitable training aids, books, manuals, and publications covering the ESS system which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

c. Overhaul of the Electric Drive System: This will be a course of not less than forty (40) hours, wherein the electric drive will be taken through the overhaul procedure and a dynamometer test. This course will be conducted in the Cerone Overhaul and Repair Facility or the OEM training facility. Delivery: Once, to a class size of approximately seven (7) maintenance personnel, as coordinated by VTA.

   The contractor will provide suitable training aids, books, manuals, and publications covering the Electric drive system which will be distributed to students during training. These materials will be kept by the students and serve as reference materials while on the job.

Stores (Parts) Training
Provide four (4) hours of training to VTA Parts Personnel on parts usage on these coaches. 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 VTA Contracts and Materials Management in coordination with the Contractor.

Operator Training
Provide twenty (20) hours of training to VTA Technical Trainers on driving characteristics of the bus, use of all controls, gauges and warning lamps, 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 Operations trainers in coordination with the Contractor.

TS 5.6.1 Instructional Manual

The Contractor will supply the following instructional materials, subject to availability from manufacturers of sub-component items, ninety (90) days before delivery of the first production bus provided under this Contract. Two detailed electrical system instructor guides and training aids to cover the following:

1) Explanation of the electrical and electronic systems;
   a) Electrical and electronic component function and location;
   b) Wiring diagram analysis and interpretation;
   c) Troubleshooting the electrical and electronic systems;
   d) Use of diagnostic test equipment and analysis of results;
   e) Preventative maintenance of the electrical system and components.
   f) Two complete sets of master engineering electrical and electronic wiring diagrams.
   g) Two sets Programmable Logic Controller videos.

2) Two detailed Energy Storage System instructor guides and training aids to cover the following:
   a) Explanation of the system;
   b) System component function and location;
   c) Troubleshooting and overhaul of the ESS;
   d) Use of diagnostic test equipment and analysis of results;
   e) Preventative maintenance of the ESS.
   f) Two OEM ESS troubleshooting and overhaul videos and/or slide/tape training sets.
   g) One set of ESS wall-chart training aids and one set of the color transparencies of the wall-charts.
   h) One ESS module, complete, less the battery cells.

3) Two detailed Electric Drive System instructor guides and training aids to cover the following:
   a) Explanation of the Electric drive system;
   b) Electric drive system component function and location;
   c) Troubleshooting of the electronic control system;
   d) Troubleshooting and overhaul of the Electric drive;
   e) Use of diagnostic test equipment and analysis of results;
   f) Preventative maintenance of the Electric drive.
   g) One set of Electric drive overhaul color-overhead transparencies.
   h) Two color-slide and audio-(or video-) tape sets of the Electric drive overhaul process.
   i) One color wall-chart series of the Electric drive.

4) Two detailed HVAC system instructor guides and training aids to cover the following:
   a) Explanation of the HVAC system;
   b) Troubleshooting of the HVAC system;
   c) Use of diagnostic test equipment and analysis of results;
   d) Preventative maintenance of the HVAC system;
   e) The function and operation of Programmable Logic Controller in the HVAC system.
   f) One wall-chart depicting the operation of the HVAC system and two color transparency sets depicting the operation of the HVAC system.

5) Two detailed air system instructor guides and training aids to cover the following:
   a) Explanation of the air system;
   b) Air system component function and location;
   c) Troubleshooting of the air system;

d) Use of diagnostic test equipment and analysis of results;
e) Preventative maintenance of the air system.
f) One color wall-chart of the bus air system depicting air flow, pressures, and components and two color transparency sets depicting the bus air system.
g) Two comprehensive air system video sets.

6) Two detailed foundation brake and ABS system instructor guides and training aids to cover the following:
   a) Explanation of the foundation brake and ABS system;
   b) Troubleshooting of the foundation brake and ABS system;
   c) Use of diagnostic test equipment and analysis of results;
   d) Preventative maintenance of the foundation brake and ABS system.
   e) One set of color wall-charts depicting foundation brake component functions and two sets of color transparencies of the foundation brake system wall-charts.
   f) Two comprehensive foundation brake system video sets.

7) Two detailed differential and propeller shaft instructor guides and training aids to cover the following:
   a) Explanation of the differential and propeller shaft;
   b) Troubleshooting of the differential and propeller shaft;
   c) Preventative maintenance of the differential and propeller shaft.
   d) Two sets of color wall-charts depicting the differential and propeller shaft and two sets of color transparencies of the wall-charts.

8) Two detailed suspension, steering, alignment and axle instructor guides and training aids to cover the following:
   a) Explanation of the suspension, steering and axle systems;
   b) Troubleshooting of the suspension, steering and axle systems;
   c) Use of diagnostic test equipment and analysis of results;
   d) Preventative maintenance of the suspension, steering and axle systems;
   e) Cutaway of the power steering pump supplied;
   f) Cutaway of the power steering gear supplied;
   g) Alignment procedures.
   h) Two sets of color wall-charts depicting steering system components, hydraulic flow and pressures and two sets of color transparencies of the wall-charts.

9) Two detailed wheelchair ramp instructor guides and training aids to cover the following:
   a) Explanation of the wheelchair ramp system;
   b) Troubleshooting of the wheelchair ramp system;
   c) Use of diagnostic test equipment and analysis of results;
   d) Preventative maintenance of the wheelchair ramp system.
   e) Two sets of color wall-charts depicting the wheelchair ramp system components, electrical schematics, hydraulic flow and pressures and two sets of color transparencies of the wall-charts.
   f) Use of diagnostic test equipment and analysis of results;

TS 5.6.2 OEM "Train the Trainer" Maintenance Training

The Contractor will secure, from the OEM vendors four "Train the Trainer" course slots covering the systems listed below. The "Train the Trainer" program for VTA Instructors will be accomplished through a combination of Contractor, OEM vendor VTA-site, and OEM-site training, covering preventive maintenance,

overhaul, diagnostics and troubleshooting, and repair of the buses that the Contractor will provide to VTA. All courses will include transportation, lodging and meals. The training will be provided in two phases: pre-delivery, and post-delivery of buses. All four trainers will not necessarily be trained simultaneously. Scheduling of the phases of instruction will be done by VTA in coordination with the Contractor. VTA expects this to be a total of 12 to 15 of training for up to 4 VTA maintenance trainers. This time does not included any required travel time.

The "Train the Trainer" program will include the following:

1) Programmable Logic Controller System (if supplied)
   a) The PLC courses will include but not be limited to:
      i) Introduction to PLCs
      ii) Diagnostics and Troubleshooting of PLCs
      iii) Programming the PLC

2) Energy Storage System
   a) The ESS courses will include but not be limited to:
      i) ESS diagnostics, troubleshooting, and use of diagnostic tools
      ii) Electric fan cooling system
      iii) ESS overhaul

3) Electric drive System
   a) The Electric drive courses will include but not be limited to:
      i) Electric drive diagnostics, troubleshooting, and use of diagnostic tools
      ii) Service and adjustments
      iii) 'Beltless alternator' vehicle charging system
      iv) Electric drive overhaul

4) Heating, Ventilation, and Air Conditioning System (HVAC)
   a) The HVAC courses will include but not be limited to:
      i) HVAC diagnostics, troubleshooting, and use of diagnostic tools
      ii) Service and adjustments
      iii) AC Certification

5) Door System
   a) The Door System courses shall cover both the CLASS system and the air motor system and will include but not be limited to:
      i) Operation and Maintenance
      ii) Diagnostics and troubleshooting
      iii) Use of service and adjustment/calibration tools
      iv) overhaul, service and adjustment

6) Electronic Destination Sign
   a) The Electronic Destination Sign course will include but not be limited to:
      i) Operation, Maintenance and Programming
      ii) Diagnostics and troubleshooting
      iii) Use of service and adjustment and programming tools
      iv) overhaul, service and adjustment

7. Differential And Propeller Shaft
   a. Operation and maintenance
   b. Diagnostics and troubleshooting
   c. Use of service and diagnostic tools
   d. Overhaul, service and adjustments

8. Suspension, Steering and Axle Systems
   a. Operation and maintenance
   b. Diagnostics and troubleshooting
   c. Use of service and diagnostic tools
   d. Overhaul, service and adjustments

9. Wheelchair Ramp
   a. Operation and maintenance
   b. Diagnostics and troubleshooting
   c. Use of service and diagnostic tools
   d. Overhaul, service and adjustments

10. Fire suppression system
    a. Operation and Maintenance
    b. Diagnostics and troubleshooting
    c. Recharging system after activations

TS 5.6.3 Training Aids

The Contractor will supply the following training aids 90 days before the delivery of the first production bus.

1) One standalone electronic destination sign and annunciator system powered by a 12v battery.
2) One Programmable Logic Controller (PLC) test and operation training aid consisting of a complete set of PLC I/O blocks, and typical output items such as lights. The unit will be constructed on a plywood frame, be no larger than 4x12 feet, and be mounted on a moveable stand. The unit will be powered by a self-contained 12v battery power supply with an input voltage 12v(same as bus). Wiring of the unit must include a junction panel enclosure and terminal strips for the purpose of inducing problems for student troubleshooting and training. The electrical training aid will be constructed using actual bus parts identical to those used on the vehicles provided to VTA under this contract
3) One ESS module, complete, less the battery cells.

TS 5.6.4 Special Tools and Diagnostic Equipment

The following list of special tools and diagnostic equipment shall be provided by the Contractor upon delivery of the first bus. All tools and electronic test equipment described throughout this section must be of heavy duty industrial grade quality approved by VTA. Additionally, VTA requests a comprehensive list of specialty tools recommended by the proposer to service and rebuild the bus over its usable life as defined in this RFP. Tools specifically requested in the RFP should not be excluded from this list. Where software is provided to operate diagnostic equipment, a subscription for maintenance, support, and updates to that software should be included for the warranty period, including access to calibration codes.

1) Special Purpose Electrical & Electronic Diagnostic Tools:

a) Digital multi-meter with automotive probe set (Fluke 88V and TLK 282).
b) Digital current clamp and meter (Fluke 375).
c) 4-Channel USB scope with automotive sensor and probe kit (Pico Scope 4425 Master Kit).
d) PLC logic analysis software, tester, and computer interface. Should include provisions for PLC/multiplex programming.

2) Special Purpose ESS Tools:
   a) ESS diagnostic computer connection and software. Interface to include detailed BMS data and data logging capabilities.
   b) One ESS stand with adapters for overhaul purposes.
   c) Laptop computer compatible with diagnostics software. Laptop shall be Durabook S15AB having the storage and performance capability to effectively handle all the diagnostics utilized on the bus, or approved equal having equivalent or superior durability, dependability and ease of use. At a minimum they are to be equipped with 500 GB of SSD memory, 8 GB of RAM, two USB and one serial (RS232) port.
   d) Handle digital battery module analyzer (Fluke BT521).
   e) Handle thermal imager (Fluke Ti400).
3) Special Purpose Electric drive system Tools:
   a) Drive unit diagnostic computer connection and software. Interface to include detailed system analysis and data logging capabilities.
   b) One electric drive stand with adapters for overhaul purposes.
   c) One set of dynamometer controls and adapter plates to mate the Electric drive supplied to the VTA Hicklin (HTDD) transmission dyno.
   d) Electric motor power quality analyzer (Fluke 438-II).
   e) High voltage insulation tester (Fluke 1550C).
   f) RF/EMF spectrum analyzer (Tektronics RSA306 USB Spectrum Analyzer)
4) Special Purpose HVAC System Tools:
   NONE REQUIRED
5) Special Air System Tools:
   NONE REQUIRED
6) Special Foundation Brake System Tools:
   a) Brake system diagnostic computer connection and software. Interface to include the ABS system.
   b) ABS sensor R&R kit (MAN 6408307 or similar for the proposer's selected axle).
   c) Repair Kit Disk Brakes and Calipers (MAN 6408310 or similar for the proposer's selected axle).
7) Special Differential and Propeller System Tools:
   a) Differential Repair kit, if applicable (MAN 66444303 or similar for the proposer's selected axle).
   b) Complete set of differential overhaul kit, if applicable.
8) Special Purpose Suspension, Steering, and Axle Systems Tools:
   a) Hub Repair kit (MAN 6408306 or similar for the proposer's selected axle).
   b) Pinion Seal Repair Kit (MAN 6444302 or similar for the proposer's selected axle).
   c) Any specialized bushing puller/removal tools.
9) Speeial Purpose Body and Chassis System Tools:
   a) Body dimension analysis tool (Faro Edge Portable CMM with 3D laser seanner).
   b) Hand held metal analysis tool (Oxford Technology X-MET8000 Expert Metal Analyzer).
   c) Ultra sonic weld inspection tool (Elcometer NDT FD700DL+).
   d) Advance noise/sound analyzer (NTI XL2 & Class 2 M4360 Mic).
   e) Advance portable composite structure analyzer, if applicable to proposed chassis (Olympus Scan MX, with software, scanner, and probe adapter).

10) Destination sign and annunciator diagnostic, repair and programming tools and software.
11) Starter
NONE REQUIRED
12) Tow equipment
a) Three sets of specialized tow adapters if required.

Attached below is a list that serves as an example of the type of tools VTA is requiring when the term 'special tools' is used. The list is provided strictly as an example.

Ep 40/50 'Maintenance' and 'Overhaul' Essential Tool List			
Tool Reference #	Tool Name/Description	Tool Classification	
		Overhaul (Ev)	Maintenance
8092	Driver Handle	X	X
J-46699	Front Support Seal Installer	X	X
J-46702	Output Seal Installer	X	X
J-46703	Spanner Nut Torque Tool	X	X
J-46705	C1/C2 Trim/Blocking Valve Installer	X	X
J-46706	Relay & CM Valve Installer	X	X
J-46708	High Impedance Digital Multimeter Kit	X	X
J-46709	Power Adapter for TCM/VCM/DPIM/ESS	X	X
J-46710	CAN Adapter to 9-pin Deutsch	X	X
*N-00001	Softing CANcard2 (PCMCIA) & Adapter Cable (NOTE: Price of shipping included)	X	X
J-46711	Harness Assembly, TCM/DPIM/VCM	X	X
J-46712	Harness assembly, Drive Unit/ESS	X	X
J-45023	Control Main Filter Wrench	X	X
J-46713	Energy Storage Removal/Installation Fixture	X	X
**D-00001	ESS Installation Protection Device (BIPD)	X	X
**D-00002	DPIM Installation Protection Device (DIPD)	X	X
00002-03100-S/M/L	HV Gloves, Class 00 (1Pair required)	X	X
J-38548-A	Converter End Play Gage	X	
J-48122	Front Support Bushing Installer	X	
J-48123	Pump Assembly Bushing Installer	X	
J-48124	Damper Assembly Bushing Installer	X	
J-48130	Input/Output Shaft Bushing Remover	X	
J-48131	Input/Output Shaft Bushing Installer	X	
J-48141	P3 Carrier Flange Bushing Installer	X	
J-48142	P3 Ring Gear Flange Bushing Installer	X	
J-48132	P2 Drive Hub Assembly Bushing Installer	X	
J-48133	P2 Carrier Bushing Installer	X	
J-48139	Bearing Installer	X	
J-48125	Bearing/Race Remover	X	
J-48138	Inner Bearing Race Installer	X	
J-48347	C1 Clutch Housing Roller Bearing Installer	X	
J-48365	Bearing Race Installer/Remover	X	
J-48341	C1 Clutch Housing Inner Race Installer	X	
J-48361	Taper Bearing Installer	X	

J-48612	Taper Bearing Remover	X
J-48129	Pump Assembly Spring Compressor	X
J-48149	Stator Protector	X
J-48344	Selective Shim Measurement Tool	X
J-48530	C2 Retaining Ring Removal Tool	X
AMB-45	AMB-45 Amprobe Device (Required for measuring insulation resistance)	X
J-46701	Stator Housing Fixture - Lifting/Turnover Stand	X

TS 5.7 Engineering Support and Service Representative

The Contractor shall, at its own expense, have a competent engineering representative(s) available on request to assist VTA's staff in the solution of engineering or design problems within the scope of the specifications that may arise during the warranty period. It is expected that VTA requests for assistance are responded to within two (2) business days of the submittal by VTA with a minimum of an acknowledgement of the request and associated issue. Response can be made by telephone or email. Responses must at a minimum be addressed to the VTA requestor, a representative of VTA maintenance engineering, a representative of VTA maintenance training, and the current VTA bus fleet maintenance operations manager. VTA expects the contractor to work in a consist manor maintaining regular communication with VTA until the issue is resolved.

At a minimum, a service representative(s) shall be at VTA on a daily basis from delivery until VTA's completion of acceptance including: two (2) weeks following the acceptance of the last coach in each group of deliveries; one day per week for the month following the above; and one day per month for one year following acceptance of the last coach in each group of deliveries.

The obligations under this section do not relieve the Contractor of responsibilities under Warranty Provisions.

TS 5.8 Operating Environment

The bus shall achieve normal operation in ambient temperature ranges of -4 degrees Fahrenheit to +113 degrees Fahrenheit, and at altitudes up to 7,500 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below -10 degrees F and above 115 degrees F, or at altitudes above 7,500 feet.

Special equipment or procedures may be employed to start the bus after being exposed for more than 4 hours to temperatures less than 30 degrees F without the drive system in operation. Speed, gradability, and acceleration performance requirements shall be met at, or corrected to, 85 degrees F, 29.00 in. Hg., dry air.

TS 5.9 Noise

TS 5.9.1 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 75 dBA measured at the outside skin of the bus shall have a sound level of 60 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the Drive system and accessories switched off.

The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 75 dBA. The driver area shall not experience a noise level of more than 70 dBA. Measurements of interior noise levels shall be taken in accordance with SAEJ2805.

TS 5.9.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 70dBA under full power acceleration when operated at 0 to 35 mph at curb weight. The maximum noise level generated by the bus pulling away from a stop at full power shall not exceed 73 dBA. The bus-generated noise at curb idle shall not exceed 55dBA. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by VTA andSAEJ366.

Exterior noise shall not exceed California or Federal standards. California standards are shown in Articles 9 and 10 of Chapter 4, Division 2 of California Title 13 Regulations.

TS 5.10 Fire Safety

The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emission regulations. The regulations include but are not limited to: FMVSS 302 and CAL 133. These provisions shall include the use of fire-retardant/low-smoke materials, fire detection systems, bulkheads and facilitation of passenger evacuation.

Fire detection and suppression systems shall be provided by Contractor.

TS 5.10.1 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 FTA Docket 90-A, dated October 20, 1993. Materials entirely enclosed from the passenger compartment, such as insulation within the sidewalls and sub-floor, shall comply in accordance with section TS 72.7. At VTA's discretion, 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 may be exempted from this requirement.

TS 5.11 Fire Suppression

The bus shall be equipped with both a stand-alone fire detection system and a fire suppression system.

Detection of a fire may be by means of infrared/heat or rate of rise/heat. Detection system must be capable of operating without false detection from normally occurring drive temperatures, any source of light, or steam cleaning. It shall be impervious to oils, fuels, and chemicals normally found in a garage environment, and to UV light. It must provide detection capability to all risk zones.

In addition to the other alarm sensors, an optical infrared flame detector shall be provided to monitor all ESS modules/enclosures and nearby area.

Upon detection, the system will alert the operator with visual and audible signals and initiate automatic system shutdown. The fire detection layout shall be approved during the pre-production meeting. Power for the fire detection system shall be provided by the bus electrical system directly from the vehicle battery terminals or through dedicated power and ground buss bars. Nominal power consumption of the system should not exceed 300mA. A battery-backup system shall be provided to give system functionality in the event primary system power is interrupted. The battery must be easily replaceable and must be either readily available through retail outlets or else have a minimum life of 500 hours at system amperage.

The bus shall be equipped with a Fogmaker fire suppression system or approved equal having similar performance, durability, ease of re-charge, and ability to work with bus tipped over or flipped. The suppression system shall be designed to extinguish any fire occurring in the electric drive or ESS compartment. Automatic and Manual activation must both be available regardless of system power.

A control panel shall electrically supervise the automatic fire suppression system. Indication of Normal, Fault and Fire conditions shall be displayed on a control monitor. The system control panel shall shut down the drive system within ten (10) seconds of a fire being detected through the driver system protection shut down and override system. The electric cooling fans shall also be shut down within the same time period. Location of the control panel must be convenient to a fifth percentile operator for manual activation of the fire suppression system while also providing adequate visibility of the warning lights. The manual actuator shall have a protected device to avoid accidental activation. It shall also leave a mechanical indicator of manual activation. All system control wiring must meet all requirements of this RFP.

The fire suppressions system shall be triggered by a detection system separate from the fire alarm system. The detection for the fire suppression system shall be by means of a gas pressurized tube, or equivalent, routed near potential compartment hot spots that shall automatically activate the fire suppression system when the tube is melted and pressure released. An indicator light for the detection system pressure shall be provided on the suppression system control panel. Any proposed approved equal must have durability and functionality at least equivalent to that of Fogmaker's detection system

The fire suppression material shall be stored in a cylinder with sufficient capacity to provide extinguishing performance for 50 seconds minimum. It shall be treated and painted to resist rust. The cylinder shall be rated for twelve (12) years minimum hydrostatic retest. An accumulator of similar construction must be supplied to provide system release. The cylinder shall be outfitted with a charge gauge and a forged brass valve assembly. All piping between the cylinder and the nozzles shall be rust proof. The cylinder shall be mounted out of the view of passengers and the public, in a location that will not exceed the manufacturer's recommended operating temperatures or be subject to excessive environmental extremes, but with easy access during pre-trip inspections to allow viewing the charge gauge. Location to be submitted with proposal. Preference will be given for systems that best trade-off the competing location requirements.

Fire suppression material shall have a chemical composition that does not accelerate metal corrosion due to its exposure.

A minimum of four Brass nozzles shall be located in the electric drive and ESS compartment fitted with dust caps that, upon actuation, are displaced to allow full flow of the fire suppression agent. The bus manufacturer shall provide written certification from the fire suppression manufacturer that all installation requirements have been met and sufficient testing was made on the first bus system to ensure reliable firefighting operation.

TS 5.12 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.

DIMENSIONS

TS 6. Physical Size

With the exception of exterior mirrors, marker and signal lights, bumpers, fender skirts, and rub rail, the buses shall have the following overall dimensions as shown in Figure 6-1:

Length: Not to exceed 43 feet.
Width: 102 inches +0,-1 inch.
Overall Height: 144 inches, maximum.

Note: Any bus design proposed must meet all California vehicle length laws.

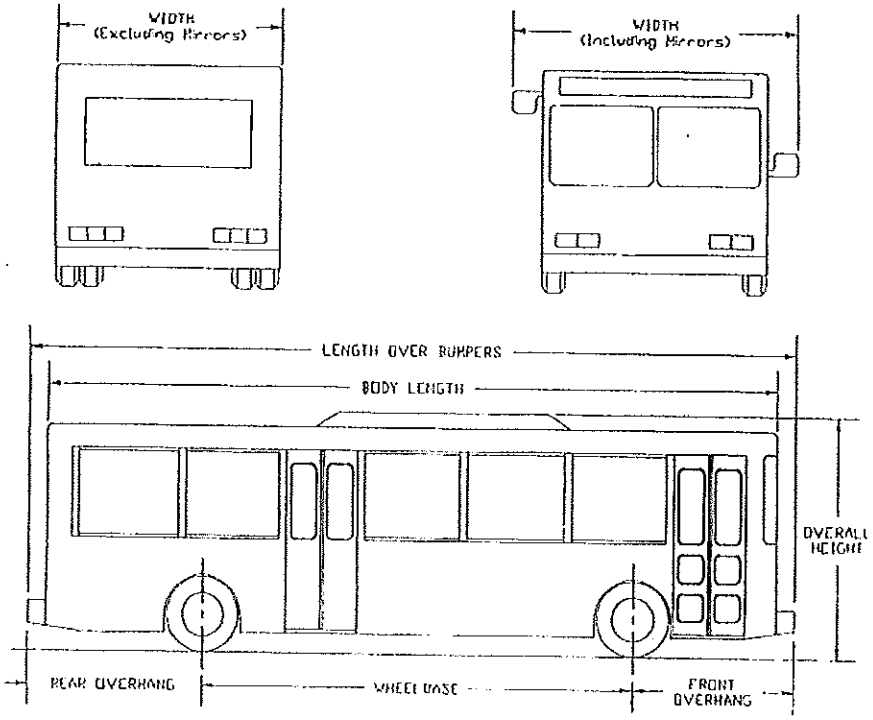


FIGURE 6-1

TS 6.1 Step Height

TS 6.1.1 Transit Coach

The step height shall not exceed 15 inches. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus. Should the step in height be greater than 15 inches, VTA requires that the bus kneeling to be increased by an amount equal to the height difference. For example should the setup in height be 17 inches, the bus should kneel 5 inches instead of 3.

TS 6.2 Underbody Clearance

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

TS 6.3 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.

TABLE 2

Angle	30 to 45ft Bus
Approach	8.3 deg (min.)
Front breakover	8.3 deg (min.)
Rear breakover (articulated only)	n/a
Departure	8.3 deg (min.)

TS 6.4 Ground Clearance

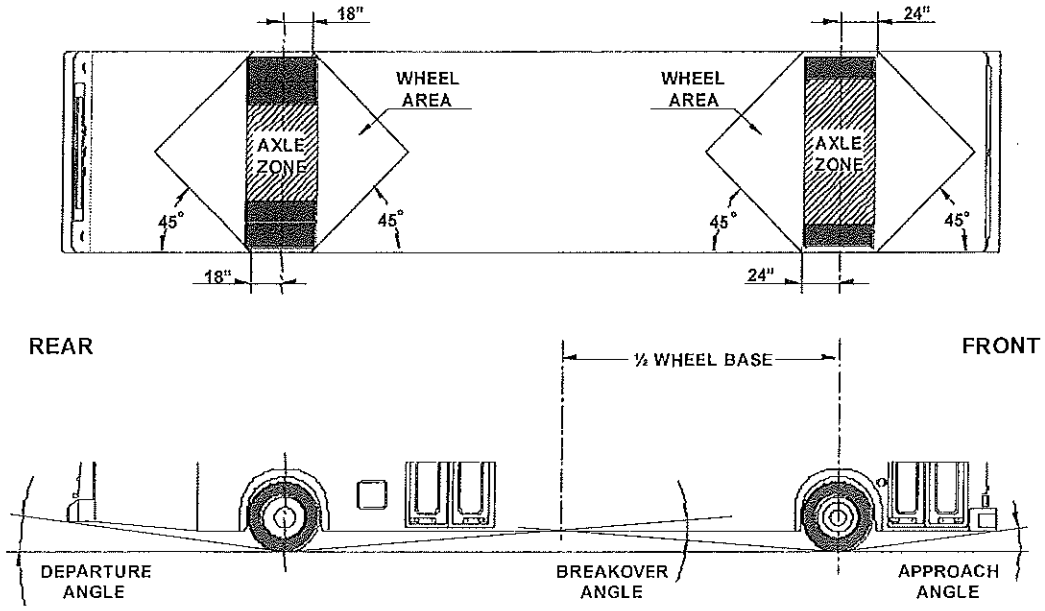
Ground clearance shall be no less than 7.8 in., (8 in. at jacking pad) except within the axle zone and wheel area.

Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5.0 in.

Wheel area clearance shall be no less than 7.8 in. for parts fixed to the bus body and no less than 5.7 in. for parts that move vertically with the axles.

– FIGURE 2

Transit Bus Minimum Road Clearance



TS 6.5 Floor Height

TS 6.5.1 Transit Coach

Height of the step above the street shall be no more than 15 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.

Floor height measurements must meet ADA and California Title 13 regulations.

TS 6.6 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 propulsion system shall be sized to provide sufficient power to enable the bus to meet the defined acceleration, top speed and gradability requirements, and operate all propulsion-driven accessories using actual road test results and computerized vehicle performance data.

The 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.

TS 7.1 Top Speed

The bus shall be capable of achieving a minimum 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.

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 7.2 Gradability

Gradability requirements shall be met on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating. The power plant shall enable the bus to maintain a speed of 40 MPH on a 2 ½-percent grade and 15 MPH on a 10 percent grade. At a minimum while in reverse, the bus shall be able to climb a 12 percent grade. Preference will be given to configurations which can demonstrate higher speeds and/or at steeper grades.

TS 7.3 Acceleration

TS 7.3.1 Non-Hybrid

Section not used

TS 7.3.2 Acceleration Hybrid

Section not used

TS 7.3.3 Acceleration Full Electric

The propulsion and braking systems shall meet the performance requirements of the Duty Cycle.

Braking application and performance shall remain consistent regardless of ESS 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.

Manufacturer to provide a complete list of programmable acceleration and deceleration settings with performance for each setting. Performance data to include acceleration data as shown in Table 3 and an estimate of effect on energy consumption per mile on a standard drive cycle.

Preference will be given to configurations that can demonstrate faster accelerations.

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

Speed (mph)	Maximum time (seconds)
10	5
20	10
30	13
40	21
50	33
60	43
65	55

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 when run on the FTA ABD Cycle shall be at least 150 miles with a total on time of 20 hours with a full ESS. The drive time shall be assumed at full passenger with the HVAC and an ambient temperature of 95 degrees F. Any additional on time to meet the 20 hour requirement can be assumed to be stopped at idle, but with the HVAC off. The contractors are shall provide real world data to validate their full charge range. If the provided data is not for the exact drive cycle listed here, the Proposer is expected to provide a detailed explanation of how the provided data correlates to this requirement. Should real world data be unavailable the proposer shall provide a detailed model and analysis clearly explaining how their vehicle meets the range requirements. VTA prefers to get an editable electronic version of any model used to estimate vehicle range.

TS 8. Energy Economy (Design Operating Profile)

Test results from the FTA ABD Cycle economy tests or other applicable test procedures shall be provided to VTA. Results shall include vehicle configuration and test environment information. Energy economy data shall be provided for each design operating profile. The design operating profile is assumed to be defined by the FTA ABD Cycle.

ESS energy consumption tests shall be run on these four duty cycles:

- Manhattan: 6.8 mph
- Orange County: 12.7 mph
- UDDS: 19 mph
- Idle time

This data should include a breakdown of power consumption by subsystem.

VTA expects energy consumption data to be provided for each of the listed test cycles. For evaluation purposes VTA will only use the Orange County cycle.

Altoona testing results for kWh/miles must be submitted for the proposed power plant. Preference will be given for systems that deliver the best performance, with the test bus configuration taken into account.

POWER PLANT

TS 9. Engine

TS 9.1 Engine

Not used, see TS 9.3 Propulsion System (Full Electric)

TS 9.2 Propulsion System (Hybrid)

Section not used

TS 9.3 Propulsion System (Full Electric)

TS 9.3.1 Propulsion System Description

The bus shall be powered by a fully battery electric propulsion system. Function and operation of the bus shall be transparent to the bus operator and passengers. The OEM shall ensure that the bus structure can successfully accept the installation of the propulsion system and be operated on the stated duty-cycle for a period of 12 years without a structural failure. At a minimum, the propulsion system shall comply with applicable local, state and/or federal emissions and useful life requirements. The propulsion system shall comply with local, state and federal (maintenance) and other applicable sections.

The energy storage system shall be rated for the GVWR or greater of the bus.

The power plant shall be removable as a unit. The power plant, accessories and associated hardware shall be installed such that oil or fuel leaks shall not drip on hot spots.

Certified approval, by the manufacturers of the ESS and electric drive, for the combination of the systems that are to be used, must be submitted by the Contractor.

All related components and configuration that affect operational range, such as, fan control/operation, energy storage, axle ratio, etc., shall be selected accordingly.

Accessories shall be electrically powered.

Drivetrain components and all other related components shall communicate data using SAE Recommended Communications Protocols J1939.

The drive controllers, power invertors, DC-DC convertors, energy storage batteries and energy storage shall be removable as units and shall be interchangeable between similar buses. Should any of these units require software or firmware reconfiguration the contractor will provide the necessary software and programming tools.

Detailed description of the components for the propulsion system with specifications shall be supplied by the proposer for the electric drive and energy storage system as part of the proposer's Technical Proposal.

The electronic control system features shall include road speed governing, appropriate to the electric bus configuration and an automatic system shut down in the event sensors detect critical issues with any high voltage system. System shut down shall be executed in a series of automatic reductions of vehicle performance over 30 seconds. Driver shall have an override switch to allow a maximum of 30 additional seconds of vehicle operation in the event of automatic system shut down.

TS 9.3.2 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. However, the Agency shall recognize that properly rated test equipment and safe electrical work practices are essential when servicing high-voltage electric drive components. Any other component requiring service or replacement shall be easily removable. The Contractor shall provide all specialty tools and diagnostic equipment required for maintaining the propulsion system in accordance with the Special Tools List.

For diagnostics and trouble shooting, there shall be a means of by-passing the electronic drive control module, without removing it from the bus, using a spare electronic control module which can be connected only in the correct way.

A Vehicle Speed Sensor, wired to the drive Electronic Control Module shall be provided. Location and installation requires VTA approval. Sensor is to be available for use with VTA installed systems which require vehicle positioning data.

The drive control system shall prevent high electric motor RPM operation before adequate lubrication is available to critical components.

Additional service compartment gauges required are an drive hour meter, a voltmeter for the 12 volt system, a voltmeter for the 24 volt system, and energy storage main SOC and temperature gauge. Each gauge is to be plumbed to the appropriate sump. Multi-function electronic gauged capable of reading errors and messages from the bus data networks is preferred and maybe be used in place of other gauges.

Rear run controls shall be provided in the rear compartment. These controls shall be located with the above gauges and at a minimum include:

Front/Rear system run switch.
System start switch.
System stop switch.
Drive/ESS cooling fans on/off test switch

Full flow oil filters shall be of the screw-on type.

No filter shall be installed so that routine replacement of the element requires the removal of fasteners threaded into aluminum material.

TS 9.3.3 Primary Propulsion Unit and Electric Drive Systems

The system shall supply a nominal 400 to 700 VDC. Power output under peak load shall be a minimum of 265 horsepower (200 kW).

The system shall have an auto neutral feature that shall cause it to automatically and immediately shift to "Neutral" whenever the system is 'in gear' and the parking brake is applied. This system shall also automatically shift the Drive system to "Neutral", after a 5 minute delay, whenever either the middle or rear exit door brake interlock is applied.

The electronic controls shall be compatible with multiplex wiring systems, capable of receiving inputs from the throttle, shift selector, and drive system. Electronic controls shall be compatible with either 12- or 24-volt systems, provide consistent shift quality, and compensate for changing conditions such as variations in vehicle weight and system power. A brake pedal application of 15 to 20 psi shall be required by the operator to engage forward or reverse range from the neutral position.

The electronically controlled energy storage and drive system shall have on-board diagnostic capabilities, able to monitor functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. A diagnostic reader device connector port, suitably protected against dirt and moisture, shall be provided in the operator's area. The on-board diagnostic system shall trigger a visual alarm to the operator when the electronic control unit detects a malfunction. The energy storage shall contain built-in protection software to guard against severe damage.

A list of options shall be provided at time of request for approved equals, for VTA review.

All high voltage wiring conductors carrying voltages of 50 VAC, 50 VDC, or greater, shall be considered High Voltage (HV).

Protection from electric shock hazards is imperative. Casual contact with components that have a sufficient voltage to cause bodily injury shall not be possible. No passenger, driver, or passerby shall be able to contact such equipment. For maintenance purposes, all devices that contain high-voltage circuits shall be contained within protective enclosures or enclosed bus body compartments. All access covers for such enclosures and compartments shall be permanently labeled with the "DANGER - HIGH VOLTAGE" signs.

It shall not be possible to come in contact with high voltage devices with the access covers closed. Appropriate warning signs and labels shall be used to alert maintenance personnel and/or emergency crews to the presence of high voltage batteries and cabling within the bus. Ground fault protection circuits shall be provided to ensure insulation integrity between the high voltage circuit components and the bus chassis. High voltage cables and wires shall be installed in dedicated harnesses, wire conduits, or raceways. High voltage harnesses shall be identified as such by orange conduit or loom. Circuits or wiring that are not consider high voltage may not be in the same orange conduit or loom as the High Voltage wires. See also the requirements of section 5.5.3. Interlocks shall be provided on doors and covers for inverters, converters and other energy storing devices to quickly de-energize primary power from these circuits when these doors and covers are opened. The drive energy storage system enclosure, propulsion controls system (PCS) and drive motor terminal covers shall all be labeled with, "HIGH VOLTAGE WARNING" labels. The drive energy storage system, PCS, drive motor and generator shall be enclosed or covered to prevent casual contact. The PCS enclosure shall have a mechanical interlock to ensure that the high voltage connections are disconnected before the enclosure is opened. Drive batteries shall be stored in sealed containers ("tubs"). The distance between main battery terminals on each battery tub, or between one or more tubs, shall be beyond the mechanics reach to minimize potential problems. NOTE: Only batteries shall be allowed to remain a live power source.

Buses shall be equipped with a master disconnect switch that interrupts all low voltage and high voltage power. The purpose and function of the switch shall be clearly and permanently marked. The switch shall be behind a non-locking access door that is readily accessible to maintenance and emergency service personnel and shall not be located in an area where passengers can access it. The access door shall be marked by a 1"

diameter orange color dot. Opening the master battery switch circuit with the power plant operating shall not damage any component of the electrical system. The master battery switch shall be capable of being locked in the OFF/OPEN position.

The possibility of EMI (Electro Magnetic Interference and Radiation) requires evaluation and shall be, or have been, performed by and certified by the manufacturer identifying the following criteria:

- Acceptable levels of Radiated Emissions from the energy storage system both in low frequency (30Hz-30kHz) and RF frequency (30kHz-100mHz) ranges shall be identified: A report shall be submitted to VTA utilizing the guidelines of MILSTD—461 and/or SAE-J551 that identifies known properties in similar OEM built Electric buses that had devices, such as: portable/mobile radios, PA systems, fare collection units, multiplex and door control systems tested and approved.
- RF susceptibility levels: Guidelines of MILSTD-461 and/or SAE-J551, as well as known properties of existing devices, such as: radios, PA systems, fare collection units, and door control shall be included.
- Electromagnetic compatibility between the various electrical and electronic devices mounted on the Electric bus shall be ensured by utilizing established EMC containment techniques, such as proper shielding, grounding, filtering, signal wiring separation, switching frequency management and other means.
- Adequate EMI/EMC testing shall have been conducted, by analysis only, on the individual components and/or on the finished bus to prove that design goals for EMI/EMC have been met
- A summary report shall be delivered to VTA covering 1-4 above with the proposal. In addition, any problem areas shall be identified.

TS 9.3.4 Energy Storage and Controller

Design and performance shall be provided to VTA. Energy storage shall be of a commercial design capable of operating in VTA transit environment. The primary charging of the energy storage system shall be accomplished by the on-board Electric Drive system controller and regenerative braking.

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

The bus shall have a heavy duty energy storage unit, designed to last the life of the bus, which, coordinated with the electric drive and the rear axle drive ratio, enables the vehicle to achieve the specified top speed, acceleration and hill climbing capability while still maintaining passenger comfort and providing a smooth ride. The ESS shall be rated to operate at the GVWR of the bus. ESS is expected to retain 70% of its as new energy carrying capacity after 7 years and 350,000 miles of operation.

The energy storage system shall be designed so that the required maintenance tasks can be accomplished with minimal labor, without requiring a mechanic to access the roof of the bus and without requiring a mechanic to open the energy storage module enclosures. The contractor shall provide all special equipment required to perform these maintenance tasks including one (1) complete battery module conditioner system. Such equipment shall be designed to be compatible with the electric service typically found in a bus garage (110V or 208V 3-phase; no more than 50 amp; standard connectors).

The drive energy storage system shall be composed of Lithium-ion-phosphate, Lithium Nickel Manganese Cobalt Oxide, Nickel-metal hydride or other Lithium-Ion batteries per VTA's approval, with an associated power electronics interface, diagnostic systems, and environmental controls. It shall have simple, robust diagnostics. The Energy Storage System shall comply with UN/DOT 38.3 requirements for lithium batteries or similar standards for non-lithium batteries.

Batteries shall be packaged in one or more modules, which shall be mounted in an enclosure(s) that permit ease of servicing. The system enclosure(s) shall be double –hulled to prevent any leaked substance from escaping. The energy storage system and enclosure(s) shall be designed to minimize shock hazard to maintenance personnel. Access to individual devices within each module shall be through covers or panels. Hazard warnings shall be visible on each inner cover or panel and hazard warnings shall remain visible with one or more covers open. Individual devices within a module, or the entire module, shall be replaceable within four (4) hours.

The enclosures, cell retainer, mounting locations, and other battery enclosure structures shall be design for transit service operation over 15 years. Evaluation of the battery structural durability will be based on Altoona testing results.

Interior of drive energy storage compartment shall be vented and weather tight. The inside of enclosure doors, panels or covers shall be painted with acid resistant paint and covered with a durable insulating material to prevent an electrical short if the door is damaged inwards.

The drive energy storage system shall include a management system to monitor and control the operating conditions within each energy storage system module, including voltage, current, and temperature. This system shall include an over-current and an over-temperature protection feature that disconnects flow of current to and from the energy storage modules in the event of an over-temperature or over-current condition. The provided ESS and drive unit diagnostics software shall provide real time data for all sensors in the ESS (voltage, current, temperature, etc.)

The drive energy storage system shall include a voltage equalization system that will provide real-time equalization of voltage between individual energy storage cells within each module. This equalization function shall be accomplished automatically, and shall not require manual intervention by the bus operator or maintenance personnel.

The Energy Storage System 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 passengers and the operator will not be exposed to electrical current either in normal operation or in the event of a vehicle accident. Analysis and test data shall be provided to the Agency. The 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 issues or prior incidents relating to safety.

Proposal 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.

VTA requires a minimum energy capacity, when the ESS new, of 440 kWh. VTA expects that this size ESS will provide 352 kWh of usable storage, when new, and a real world/effective range of 150 miles. VTA's preference is for additional ESS capacity above the minimum listed.

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

- The BMS system must be capable of monitoring the voltage level of cells within each battery pack. The BMS must be able to read and store individual battery or block voltages at a frequency of 1 data point per block every 15 seconds. The system must also monitor battery pack temperatures using no fewer than 2 thermocouples placed in and around each battery pack sampled at the same 4 samples per minute frequency.
- The BMS system 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 faulty battery in order to perform maintenance.
- The BMS system must be capable of engaging prudent safety interlocks when an unsafe battery condition has been detected.
- The BMS system must be able to monitor the battery state-of charge and update a gauge viewed by the operator at least once every 15 seconds.
- The BMS system must be able to communicate all data to the bus level information system for storage and communication.

Battery thermal management must be powered from an onboard source at all times. Thermal management must be continuously monitored at all times with appropriate safety interlocks installed to react to adverse conditions as stated in SAE J1772.

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 when the ambient temperature is above 105 degrees F for a period of 16 hours.

TS 9.3.5 Drive System Controller (DSC)

The DSC regulates energy flow throughout electric drive and power 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 utilized.

The drive system shall be programmable with a minimum of three choices of parameters to allow optimization of acceleration and regenerative braking, overall performance and electric power efficiency. Manufacturer shall supply performance data for each set of parameters. The system shall provide the following functionality:

- Storage of the buses data file generated on a day to day basis, to include:
    - At a minimum, duty cycle information (time stamp, vehicle speed, elevation, location, ambient temperature, etc.), and energy profile information (i.e., voltage and current from the traction motor, auxiliary systems, ESS, power electronics, onboard charging system, etc.) at 1 sec intervals
    - History of charging sessions, energy in, time stamp, SOC, etc.

- Incidents and alarms
- Health monitoring and diagnostics information

- Expert level software such that the bus is optimized per duty cycle on the fly, i.e. "adaptive learning" to consider, route, time of day, etc. The objective is to maintain the buses level of expected performance, meanwhile minimize the cost of the electric utility used for charging. If the proposed PSC controller does not have the capability to perform "adaptive learning", the Con-tractor must perform parameter tuning to help optimize the efficiency of the vehicle to the given route.
- A means of executing "limp home" instruction such that the bus is able to return to the depot from the furthest point on the route without charge assistance.
- A wireless means of communication to the on route and depot charging stations, and/or if probed via a WLAN in close proximity
- The system is assumed to include current / power sensors at strategic locations throughout the propulsion system components such that real time comparisons can be made between anticipated power flow and actual power. This feature shall facilitate health checking of components to indicate, "open", "shorted" and/or components that have considerable variance.
- The system is assumed to include the necessary sensor inputs at strategic locations, such as, temperature, voltage, pressure, etc. such that the entire array of devices are monitored in real time. This feature shall be able to execute commands for the self-preservation of component life, health, reliability and safety. The on-board diagnostic system shall trigger a visual and audible alarm to the operator when the motor controller detects a malfunction and the protection systems are activated.
- The system shall protect the traction motor(s) against progressive damage. The system shall monitor conditions critical for safe operation and automatically derate power and/or speed.
- The system shall include a sub-system capable of monitoring the level of connectivity between all propulsion components and associated cabling / connectors to the buses chassis and low (12/24 vdc) systems to insure isolation. The energy storage module shall have at least two automatic means / devices of disconnect and one manual capable of interrupting the positive and negative connections within the module enclosure, and rated for disconnect at maximum current.
- The system shall have an interlock that prevents engagement when the charger is connected to the traction battery.
- The system shall have an interlock that prevents engagement when the charger is connected to the traction battery.

TS 9.3.6 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 10. Cooling Systems

The cooling systems shall be of sufficient size to maintain all electric drive and ESS systems, at continuous operating temperatures during the most severe operations possible. The cooling system fan controls should sense the temperatures of the operating fluids and High Voltage compartment air temperature, 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.

If a liquid cooling system is provide a sight glass to determine satisfactory system coolant level shall be provided and shall be accessible by opening one of the compartment's access doors. A spring-loaded, pushbutton type valve to safely release pressure or vacuum in the cooling system shall be provided with both it and the water filler no more than 1.52 meters (60 inches) above the ground and both shall be accessible through the same access door. An overflow reservoir is to be provided. The overflow reservoir is to provide extra capacity to the system. It will be sized to sufficiently replace any common air pockets that form in the system. All critical power electronics that require liquid cooling, including the ESS, shall be capable of reporting via a diagnostics error message that the cooling lines feeding them are full of air pockets.

Any radiator used shall be of durable corrosion-resistant construction with bolted-on removable tanks. The radiator shall be designed so that a 2M mechanic can gain access to a substantial portion of the side facing the in board side of the bus for the purpose of cleaning the radiator in five minutes or less.

Any radiator used shall be designed to withstand thermal fatigue and vibration associated with the installed configuration for not less than 480,000 KM (300,000 miles) without failure.

All liquid high voltage cooling systems shall be equipped with a properly sized water filter. Electrically driven cooling fans shall be provided, they shall be temperature controlled.

Any radiator used shall be of tube and fin construction. Louvered fins are not permitted. If serpentine fins are used, they must have hemmed edges. Fin density shall be no more than 11 per inch. These fin requirements also apply to any Charge air cooler used.

Time for removal and replacement of the radiator by a 4M mechanic shall not exceed 3.5 hours.

A Test Port, MAC tools part number RFK-02 "Pete's Plug", shall be provided on the surge tank, and shall be easily accessible through the rear access door.

Silicone hose shall be used, the cooling system piping shall be fabricated to include rolled ends to enhance clamp retention where hoses connect.

The fan system shall include electronic feedback control and have diagnostics capability through a standard SAE J1939 diagnostics port. Diagnostics shall be accessible through standard laptop computers. Fan system diagnostics shall identify individual fans that have failed. The fan system may be integrated into other onboard diagnostics systems.

Fan control system shall assure maximum efficiency of the system by activating only those fans necessary to maintain the drive system at proper operating temperatures. It shall also include a feature to automatically reduce fan speed, when temperature conditions allow, and whenever the vehicle stops so as to minimize ambient noise. Fan system shall include a reversible feature to aid in cleaning the radiator. The fan system must be compatible with the bus fire control system to assure fans are all turned off within 10 seconds of an fire being detected. See Service Features above, in this section, a switch for manual activation of the fans shall be included in the electric drive compartment.

All electrically driven cooling pump are to be of a brushless motor design. Additionally there shall be no seals that prevent liquid from the pump impeller from entering the electric drive motor. They are to be brushless and seal-less pumps. The pumps shall be fully sealed, maintenance free and rated at a minimum of 40,000 hours of operation at full load.

TS 10.1 Engine Cooling

Section not Used.

TS 10.2 Charge Air Cooling

Section not used.

TS 10.3 Hybrid Drive System Cooling

Section not used

TS 10.4 Energy Storage and Drive Unit System Cooling

The thermal management system shall maintain the energy storage system components within design operating temperature limits.

The energy storage shall be cooled by a cooling system sized to maintain the battery cells within the manufacturer's recommended parameters of energy flow, thermal transfer, temperature. The cooling system shall be matched to the drive cooling system to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer.

Thermostats shall be easily accessible for replacement. Valves shall permit complete shutoff of lines for the water booster pumps. The water boost pump shall be a magnetically coupled, brushless design. All low points in the water-based cooling system shall be equipped with drain cocks. Air vent valves shall be fitted at high points in the cooling system unless it can be demonstrated that the system is self-purging. This includes all fluid cooling lines connected to any Inverter Module that requires cooling.

Oil, air or water cooled methods for the energy storage systems shall be considered if demonstrated at time of proposal to provide adequate cooling on 115 degree Fahrenheit days and all operating conditions.

Any drive unit cooling system shall be capable of withstanding the maximum allowable pressures set forth by the drive unit manufacturer. Unit flow rates and pressure requirement to meet the specification shall be provided from the ESS and drive unit manufacturers

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 as stated in SAE-J1772.

TS 11. Transmission (If required)

If multiple speed, the transmission shall be automatic shift. Gross input power, gross input torque and rated input speed shall be compatible with the propulsion system. The transmission shall be designed to operate for not less than 400,000 miles on the design operating profile without replacement or major service. The transmission should be easily removable without disturbing the propulsion system and accessible for service.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks. Electronic controls shall be compatible with either 12- or 24-volt power distribution, provide Long consistent shift quality and compensate for changing conditions such as variations in vehicle weight and engine power.

The electronically controlled transmission shall have on-board diagnostic capabilities, be able to monitor functions, store and communicate faults and vital conditions to service personnel. The transmission 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.

TS 12. Regeneration from Braking (Transit Coach)

Braking application and performance shall remain consistent regardless of ESS State of Charge (SOC) or other variances related to regenerative braking.

The energy storage system shall be equipped with a brake regeneration system designed to extend brake living service life and to generate electrical power that shall be stored in the energy storage system. The application of brake regeneration shall cause a smooth blending of both brake regeneration and service brake functions without exceeding jerk requirements.

Jerk, the rate of change of acceleration measured at the centerline, floor level of the bus, shall be minimized throughout the shifting of each Energy storage range and Brake Regeneration application, and shall be no greater than 0.3 g/sec

Brake lights shall illuminate when brake regeneration is activated.

Brake regeneration shall become engaged (with a resulting deceleration of no greater than 0.03 g) when the throttle is completely released (e.g., zero throttle). With brake regeneration, when the brake pedal is depressed to engage the service brakes, the resulting maximum resulting deceleration shall be 0.13 g. The resulting deceleration specified shall include the effects of regenerative braking, wind resistance and rolling resistance.

Actuation of ABS and/or ATC shall override the operation of brake regeneration. Regenerative braking (energy regeneration) shall not cause the driver to lose control of the bus regardless of the surface coefficient that the bus tires are on at the time. Braking effort derived from energy regeneration or dynamic braking shall be blended with the standard air brake system such that the braking response of the vehicle is similar to that of a standard diesel bus and requires no additional driver skill or training to operate than a standard diesel bus. The regenerative brake controller shall be a full range control. Stepping controls are not permitted.

The contractor shall also be responsible for a system design, submitted at time of proposal, that takes into account any necessary regenerative braking cutout when the storage system becomes fully charged and the bus is still in a downhill braking situation.

The regenerative braking system shall be equipped with an override switch concealed with a red cover and shall require the cover to be flipped to allow regenerative braking to be turned off. The switch shall be located behind the head sign access door above the operator. Regenerative braking shall operate to a minimum of 5 mph and shall reset at a maximum of 5 mph.

The regenerative braking apply system should be a two staged: (2/3's) "foot off-accelerator pedal" activated system and with (1/3) activated "off the brake applied" and be adjusted to emulate the retardation currently on VTA fleet buses equipped with conventional retarders. Adjustment will be determined on the pilot bus and then applied to all other buses in the build.

Brakes shall comply with FMVSS 121.

TS 13. Mounting

All power plant 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 power plant so as not to affect performance of belt-driven accessories or cause strain in piping and wiring connections to the power plant.

The power plant shall be mounted in a compartment in the rear of the bus.

TS 13.1 Service

The propulsion system shall be arranged for ease of access and maintenance. The Contractor shall list all special tools, fixtures or facility requirements recommended for servicing. The air cleaner, air compressor, starter, alternator, radiator, ESS, Electric Drive system, all accessories and any other component requiring service or replacement shall be easily removable and independent of the ESS or the Electric Drive. ESS and Electric drive unit status gauge shall be provided in the drive compartment. The gauge shall be capable of displaying ESS: Voltage, Current, Temperature, SOC, status, and fault codes, Drive unit: Voltage, Current, Temperature, cooling/lubricating fluid temperature/pressure, status and fault codes. These gauges shall be easily read during service and mounted in an area where they shall not be damaged during minor or major repairs.

All air intake systems shall be designed to minimize the entry of dust and debris and to maximize the life of the air filter. Air ducts shall be designed to minimize the entry of water into the air intake system. Drainage provisions shall be included to allow any water/moisture to drain prior to entry into the air filter.

Electric drive and ESS oil and the radiator filler caps shall be hinged to the filler neck and closed with spring pressure or positive locks to prevent leakage. 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.

The drive and energy storage system shall be equipped with sufficient heavy-duty filters for efficient operation and to protect the propulsion system between scheduled filter changes. To the extent practicable, the filters shall be of the spin-on, disposable type. All filters shall be easily accessible and the filter bases shall be plumbed to assure correct reinstallation.

TS 13.2 Accessories

Accessory systems shall operate without unscheduled adjustment for no less than 80,000 Km (50,000 miles) on the design operating profile. These accessories shall be driven at speeds sufficient to assure adequate system performance during extended periods of idle operation and the low route speed portion of the design operating profile. Belt guards shall be provided as required for safety and shall be sturdy in design and installation, hinged to allow access, and readily removable.

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 tamper-proof priority system shall prevent the loss of power steering during operation of the bus if other devices are also powered by the hydraulic system.

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

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

The hydraulic system shall demonstrate a mean time between repairs in excess of 50,000 miles. Hydraulic system service tasks shall be minimized and scheduled no more frequently than every 24,000 miles. 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 sensored for an off-board diagnostic system permanently attached to monitor system operation.

A tamper-proof priority system shall prevent the loss of power steering during operation of the bus if other devices are also powered by the hydraulic system.

Pressurizing the hydraulic system by means of a high voltage electric motor with proven durability located near the front of the bus or other approved location, with adequate cooling for the hydraulic fluid, is required. VTA expects the hydraulic pump to be automatically switched on and off. Only being run when the hydraulic system requires charging. Interior passenger compartment noise shall not vary more than 5 dB between the hydraulic pump being on or off. If the noise contains an audible discrete frequency, that can easily be heard in

the passenger compartment the design will be deemed unacceptable. The design is subject to VTA approval, and must be submitted for engineering review before the 1st bus starts production.

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 auto-ignition temperature of the fluid.

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

Cooling system piping shall be stainless steel or brass. If practicable, rubber hoses shall be eliminated. Necessary hoses shall be premium, silicone rubber type that are impervious to all bus fluids. All hoses shall be as short as practicable. All hoses shall be secured with premium, stainless steel clamps that provide a complete 360 degree 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.

Oil, Electric drive system fluid, cooling and hydraulic lines shall be compatible with the fluid they carry. The lines shall also be compatible with potentially damaging elements of the surrounding environment including heat and salt. Lines shall be capable of withstanding maximum system pressures. Lines within the drive unit compartment shall be composed of steel tubing where practicable except in locations where flexible lines are specifically required by VTA.

Flexible oil lines shall be kept to a minimum and shall be as short as practicable. Flexible lines shall be routed or shielded so that failure of a line shall not allow fuel or oil to spray or drain onto any component operable above the auto ignition temperature of the fluid.

Flexible lines shall be Aeroquip FC300 AQP and shall have standard SAE brass or steel, factory crimped, swivel, end fittings. Flexible hoses and fluid lines shall be individually supported and shall not touch one another or any part of the bus.

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 drive unit 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 14.3 Charge Air Piping

Section not used.

TS 15. Radiator

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

TS 16. Oil and Hydraulic Lines

Oil and hydraulic lines shall be compatible with the substances they carry. The lines shall be designed and intended for use in the environment where they are installed (for example, high-temperature resistant in the drive unit compartment, resistant to road salts near the road surface and so on). Lines within the drive unit compartment shall be composed of steel tubing where practicable, except in locations where flexible lines are required.

Hydraulic lines of the same size and with the same fittings as those on other piping systems of the bus, but not interchangeable, shall be tagged or marked for use on the hydraulic system only.

TS 17. Fueling/Charging System

TS 17.1 Fuel Lines

Section Not Used

TS 17.1.1 Fuel Lines, Diesel

Section Not Used

TS 17.2 Design and Construction

TS 17.2.1 Design and Construction, Diesel Fuel Tank(s)

Section Not Used

TS 17.3 Charging System (On Board)

All charging systems listed in this section must meet all applicable recommendations from SAE J1773, J3106 and J1772. VTA requires that any charging system used is capable of 2 way communication with the bus ESS BMS. VTA requires that both the bus and charger systems can independently command an emergency stop of the recharge cycle should a critical fault occur.

Should specific SAE specifications for transit bus charging, such as J3068 be released before vehicle delivery, VTA expects that the contractor will make every effort to ensure that the delivery systems are updated to comply with the latest specification.

Although not required, VTA expects that all necessary power electronics to convert AC charging input to DC current for ESS charging will be provided onboard the bus.

In yard "plug-in style" charging systems that can safely recharge the bus ESS from 20% SOC to 100% in less than 5 hours.

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.

VTA expects that all charging for the in service use of the initial buses purchased on this RFP will be done at a VTA maintenance facility using a direct plug-in style charger.

TS 17.3.1 Conductive Manual Interface (Plug-in Style)

VTA requires a contact style charging interface to be provided on the bus. The charging port shall be protected from water and debris intrusion. The port shall be easily accessible from the outside of the bus through a separate body access hatch. The port shall be at a minimum 91.44 cm (3') above the road surface with the bus air suspension adjusted to ride height. The port shall not be more than 152.4 cm (5') above the road surface with the air suspension adjusted to ride height. Charging ports shall be provided at the same location on both sides of the buses. The intent of this mirrored charger configuration is to accommodate a center island charging station with buses facing the same direction on both sides of the island. The system is expected to be able to charge using connections only on one side of the bus. When one side is active the other side is expected to be disabled.

Preference will be given to charging ports that comply with the CHAdeMO or SAE J1772 quick charging connector standard. Preference will also be given to other connection types that are documented in other electric vehicle engineering standards such as SAE J3068.

The system shall at a minimum be able to charge at 80 kW. Preference will be given to faster charging rates. VTA will provide infrastructure for 5 charger locations capable of 100 kW, and expects charging in the 80-100 kW range in order to meet the range and charge time requirements listed in this RFP. The charging rates and power levels may be achieved using multiple charging connections per bus, but preference will be given to single connections.

TS 17.3.2 Conductive Automatic Interface (Catenary Overhead Style)

VTA does not require a conductive automatic charging system for the bus order. All buses are required to at a minimum come with all of the required pre-wiring and mounting hard points to accommodate a in route catenary charging system such as the Eaton HyperCharger.

VTA expects the system to at a minimum be able to charge at the bus at a rate of 150 kW. Preference will be given to faster charging rates.

The buses shall automatically perform all of the steps necessary to align the bus with the charger in the bus stall. Once the operator reaches at most 15 ft from having the charging connection aligned the bus shall enter an autopilot mode which will require no driver input to complete the charging connection. This automatic mode shall be active via a protect toggle switch on the dash that shall only become active when the bus detects that it is within 40 ft of a charger. The operator can at any time switch the bus to manual operation by pressing the brake pedal. After which the auto pilot system will need to be reset by toggling the dash switch to the off position. From the time that the autopilot is engaged until the bus is connected and charging shall be no longer than 3 minutes. Once the bus has come to a complete stop, but before charging begins, the operator shall be notified that the bus and charger are align via a visible and audible indicator. The indication shall be disable either by the engagement of the parking brake or the resetting of the autopilot.

TS 17.3.3 Inductive Automatic Interface (Contactless Style)

VTA does not require a inductive automatic charging system for the bus order. All buses are required to at a minimum come with all of the required pre-wiring and mounting hard points to accommodate the latest generation of the WAVE inductive charger or a similar contact less charging system.

VTA expects the system to at a minimum be able to charge the bus at a rate of 150 kW. Preference will be given to faster charging rates.

The buses shall automatically perform all of the steps necessary to align the bus with the charger in the bus stall. Once the operator reaches at most 15 ft. from having the charging connection aligned the bus shall enter an autopilot mode which will require no driver input to complete the charging connection. This automatic mode shall be active via a protect toggle switch on the dash that shall only become active when the bus detects that it is within 40 ft. of a charger. The operator can at any time switch the bus to manual operation by pressing the brake pedal. After which the auto pilot system will need to be reset by toggling the dash switch to the off position. From the time that the autopilot is engaged until the bus is connected and charging shall be no longer than 3 minutes. Once the bus has come to a complete stop, but before charging begins, the operator shall be notified that the bus and charger are align via a visible and audible indicator. The indication shall be disable either by the engagement of the parking brake or the resetting of the autopilot.

TS 18. Charging Stations

VTA requires that a minimum of 5 bus chargers be included with the proposal. Each charger will at a minimum provide a charging rate of 80 kW. Preference will be given to faster charging rates. Note that the maximum full charge time listed in TS 17.3 may be met using multiple charger connections. However it is VTA preference to only need one charger connection per bus to meet the specified charge time. Note that the maximum available power per charging station is 100 kW.

The stations will be built inside a VTA bus maintenance facility. The actual station construction will be done by a third party contractor overseen by VTA. The proposer will however be responsible for the installation and validation of each charger in conjunction with VTA and VTA's third party contractor at the provided charging station location.

TS 18.1 Charging Station Requirements

VTA will provide the Proposer with five individual 480V 3-phase electrical connections each capable of supporting up to 100 kW.

The conceptual intent is that the "charging" infrastructure be "open" and capable of supporting buses of varying type / model, such that the system of buses and chargers would be scalable for future growth without proprietary constraint.

Each charger shall provide a connection matching that on the provided buses. The connection will provide for a direct 2 way data communication between the bus and the charger

The station connection will be of a break away type with safety systems that will deactivate all electrical energy being transferred to the bus should the connection be broken. A visual and audible alarm will sound should the connection be broken or removed unexpectedly. The system and bus connection shall be designed

such to minimize the chance for unintended electrical discharge or injury to any user. The system shall be designed to protect the bus ESS and other systems from damage in the event of a unexpected electrical discharge, station power loss, or unintended disconnect.

The charging interface and connection shall be of a durable and simple design for operation in a rugged transit environment. The charging station shall have at least one visual display. It will display the current state of charge of all connected buses as well as its charging voltage and current. Warning, alarm, and other system information must also be shown on this display.

All chargers shall be UL Classified 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 Charging System must include the following protections and driver alerts: (i) dynamic state of charge of the Energy Storage System, (ii) charge rate, and (iii) fault codes for Charging System failure alerting the operator to the severity of the fault.

Any equipment associated with the Charging Station must be vandal-resistant and weatherproof.

The proposal package shall contain a complete description of the Charging System including principle of operation, equipment components, component specifications, IP/UL protection classes, industry standard testing protocols and results, environmental requirements, general installation requirements, etc.

TS 18.2 Charging Station Construction Plan/Schedule

The Contractor shall work with the Agency to develop a schedule for charging station construction and installation of charging equipment and charger interface for the on route and depot charging stations. The construction and installation schedule should contain specific milestone and task dates.

One of the five expected bus chargers must be commissioned and operational 15 days prior to the delivery of the first bus (pilot bus). The remaining chargers must be commissioned and operational 15 days prior to the delivery of the second bus.

For the coordination of infrastructure preparation, installation and activation of bus charging equipment, Proposer shall be responsible to provide technical information for the infrastructure requirements required for the operation of the proposed charging station system. Vendor shall include as part of the proposal package, a description of the infrastructure components including all power requirements (service loads, etc.), material, and supporting infrastructure (conduits, cable, foundations, circuit breaker and panel equipment, etc.) required for the installation of the vendor supplied charging equipment. The proposal shall also include a list of equipment specifications, equipment layout and manufacturers direction for the installation of the charging equipment.

The proposer shall be required to provide review, approval, and technical information to support the VTA construction of the infrastructure required for the charging equipment. The proposer's schedule shall include these review activities and shall account for the standard VTA advertising and award of the infrastructure construction.

The proposer shall include the appropriate level of effort to provide this coordination and to perform field oversight and integration for the installation, activation and commissioning of the proposer supplied charging equipment.

TS 18.2.1 Post-delivery and final acceptance

The agency shall conduct acceptance tests on charging equipment. These tests shall be completed within 30 days after delivery and installation of equipment and delivery of the First Article bus 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 equipment release and delivery and installation at the agency's designated charging stations. The post-delivery tests shall include visual inspection, along with a verification of system(s) functionality and overall operations. No post-delivery test shall apply new criteria that are different from criteria applied in a pre-delivery test.

Equipment that fails to pass the post-delivery tests is 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 charging equipment 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.

TS 18.2.2 Certificate of Acceptance

- **Accepted**
- **Not accepted:** In the event that the equipment does not meet all requirements for acceptance. The agency must identify reasons for non-acceptance and work with the Contractor to develop a timeline of addressing the problem for a satisfactory resolution and redelivery.
- **Conditional acceptance:** In the event that the charging equipment does not meet all requirements for acceptance, the agency may conditionally accept the equipment pending receipt of contractor furnished materials and/or labor necessary to address the identified issue(s).

TS 18.3 Data Collection and Transmission

The chargers shall be equipped with a wired or wireless 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, energy consumption at the charge interface, max power, ambient temperature, etc. The charging station shall provide communications/data connections for the chargers. This applies to all charging station types listed in this document. The intent is to provide VTA a clear record of all charging events and charging costs for the buses.

Preference will be given to systems that can collect, store, and transmit additional data such as past bus warning, error codes and charging details to remote locations. Preference will also be given for charging systems that allow for remote user login and monitoring features. Additionally preference will be given to systems that can automatically output this data and integrate it into VTA's SAP system.

TS 18.3.1 Conductive Manual Interface (Plug-in Style)

VTA requires a contact style charging interface to be provided for the bus. The charging connector shall be protected from water and debris intrusion. The connector shall be at a minimum 91.44 cm (3') above the road/pavement surface . The connector shall not be more than 152.4 cm (5') above the road surface/pavement.

The chargers shall be capable of being controlled and scheduled by a centralized charger management system that allows a user to control charging start and stop times, charging SOC, and charging rate for each charger on the system. The system shall be easily programmable with custom charging schedules that include all of these parameters. Preference will be given to systems that are capable of preforming demand response charging control per the local utility's request (At VTA that would be PG&E).

Preference will be given to charging ports that comply with the CHAdeMO or SAE J1772 quick charging connector standard. Preference will also be given to other connection types that are documented in other electric vehicle engineering standards such as SAE J3068.

Each charger will at a minimum provide a charging rate of 80 kW. Preference will be given to faster charging rates. Note that the maximum full charge time and charging rates listed it TS 17.3 may be met using multiple charger connections. However it is VTA preference to only need one charger connection per bus to meet the specified charge time.

The plug-in chargers will be installed at VTA's Cerone Division Maintenance Yard at a charging station/island built and design by a third party contractor. The station shall be outdoors in a VTA designated location. The station shall provide a rain shelter for the chargers. The station shall be on an elevated cement island of a minimum height of 15 cm (8") above the yard asphalt. The island is expected to contain all necessary charging equipment and electrical cabinets to recharge 5 (five) buses. Outer perimeter corners of the island shall have steel guard bollards of a minimum diameter of 20 cm (8") and 5 ft. in height. The bollards are to be designed to protect the island and charging equipment form bus impact.

Appropriate lighting for the charger units, and bus connections shall be provided with the charging stations.

VTA will provide the proposed island with a 3 phase 480V connection to its existing nearby electrical infrastructure. The island will include a power distribution box that will split the power into 5 lines each capable of supporting 100kW each. The intent is to charge 5 buses simultaneously at a maximum of 100 kW each.

The depot chargers shall be capable of discharging the on-board energy storage system to facilitate making repairs, preferred means of discharge shall be to return the power to the utility grid.

Each provided Plug-in depot style charger shall have an emergency power down/cut off/disconnect switch. This disconnect shall be clearly marked and shall safely de-energize all parts of the charger. This disconnect shall only work for the one charger that it is associated with/connected to.

TS 18.3.2 Conductive Automatic Interface (Catenary Overhead Style)

Section not used.

TS 18.3.3 Inductive Automatic Interface (Contactless Style)

Section not used.

TS 19. Emissions and Exhaust

This solicitation is for a fully electric bus. VTA expects that there should be no measurable vehicle emissions that will pollute the air.

TS 19.1 Exhaust Emissions

Section Not Used.

TS 19.2 Exhaust System

Section Not Used.

TS 19.3 Exhaust After treatment

Section Not Used.

TS 19.4 Particulate After Treatment

Section Not Used.

TS 20. Structure, General

TS 20.1 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 VTA shall be considered for this purpose.

TS 21. Altoona Testing

Prior to acceptance of first bus (1st bus is the pilot bus if provide), 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 VTA.

If available, the Altoona Test Report, along with a plan of corrective action to address deficiencies, breakdowns and other issues identified during Altoona testing, shall be provided to VTA with the Proposal submittal. If not available, then the report shall be provided prior to acceptance of the first bus.

TS 21.1 Structural Validation

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).

Should a FEA model be used for structural validation, the proposer is required to submit a complete report of the analysis to VTA for review with their proposal. The report shall include all models and access to the software used to solve the model for until such a time as the Altoona test report is publically available.

Should the most recent Altoona test for the proposer's bus show major structural failure of any critical high voltage components such as the electric drive, or ESS the proposer must also submit a complete failure analysis report for each failure item with their proposal. These reports shall include a detailed FEA model of the failed designed and the improved design used as a replacement. Clear comparisons of the design, and improvements must be shown both in the report and the provided model.

TS 22. 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 23. 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 23.1 Passenger Compartment Bulkheads

The passenger compartment shall be separated by fire-resistant bulkheads. This bulkhead shall preclude or retard propagation of an drive or electric storage system compartment fire into the passenger compartment and shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90A, dated October 20, 1993. 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 electric drive system 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. Service 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.

TS 23.2 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 4000lb 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 lbs. 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.

Test reports or detailed engineering reports validating the crashworthiness shall be provided prior to assembly of the first bus. If a Finite Element Analysis FEA is provided as proof of crashworthiness for the proposed vehicle, it must include a qualified engineering analysis and report for crashworthiness. The report shall include all models and access to the software used to solve the model until the final award of the contract.

TS 24. Corrosion

The bus flooring, sides, roof, understructure and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and de-icing 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 VTA'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.

At a minimum, all exposed surfaces and the interior surfaces of tubing and other enclosed members below the lower window line shall be corrosion resistant through application of a corrosion protection system.

TS 25. Towing

Each towing device shall withstand, without permanent deformation, tension loads of a minimum of 1.2 times the curb weight of the bus within 20 degree 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.

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.

Provision of Glad-Hand Type Connectors for Towing
Glad-hand type connectors shall be provided at the front of the bus to allow the towing vehicle to control and operate the bus braking system during a towing operation.

The front towing devices shall permit flat towing of the vehicle without the operator on board.
The standard tow method for VTA is to attach to the bus's front axle. Therefore, front axle towing shall be as safely and easily performed as on current VTA buses. The exact method requires approval of VTA.
The front of the bus shall be equipped with seven (7) point ATA electrical connection (SAE Recommended Practice J560b) and Air Brake Gladhand Service and Emergency Line Couplers (Recommended Practice SAE J318) to provide exterior bus lighting and braking operation during towing.

The system shall be such that when the service line is disconnected, the parking brake shall apply. All connections shall be fully functional.

A metal engraved information plate shall be placed next to the gladhand connectors and shall show the correct procedure for attaching tow equipment and a method for checking that the towing air and electric lines are functioning.

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 bus. The method of attaching the tow

bar or adapter shall require the specific approval of VTA. Any tow bar or adapter exceeding 50 lbs. 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 26. 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.

TS 27. 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 28. Floor

TS 28.1 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 degrees to allow for drainage.

The floor of the bus shall 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 28.2 Design (Articulated Transit Coach)

Section not used.

TS 28.3 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 lbs. applied through the flat end of a ½ in. diameter rod, with 1/32 in. radius, without permanent visible deformation.

TS 28.4 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.

Flooring material shall be fully composite with noise-reduction characteristics.

Plywood shall not be used as flooring at any location on the bus.

TS 28.5 Slope

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

TS 29. Platforms

TS 29.1 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.

TS 29.2 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. 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 3** illustrates a means by which the platform height can be determined, using the critical line of sight.

The seat centerline must be installed in-line with the centerline of the steering column, and in-line with the centerline of the SAE H-point machine when located per SAE J826.

A California Vehicle Certification Holder, Grote or approved equal, shall be provided with each bus. The holder shall secure the registration documents, minimize dust or dirt accumulation and provide a clear window to allow viewing the registration without removing it from the holder. The holder shall be placed in an accessible fixed location, visible for inspection purposes.

Each bus shall be furnished with three reflective triangles and a 5 pound A:B:C rated fire extinguisher with mounting bracket. The reflective triangles shall be stored in an appropriate location in the bus, with the

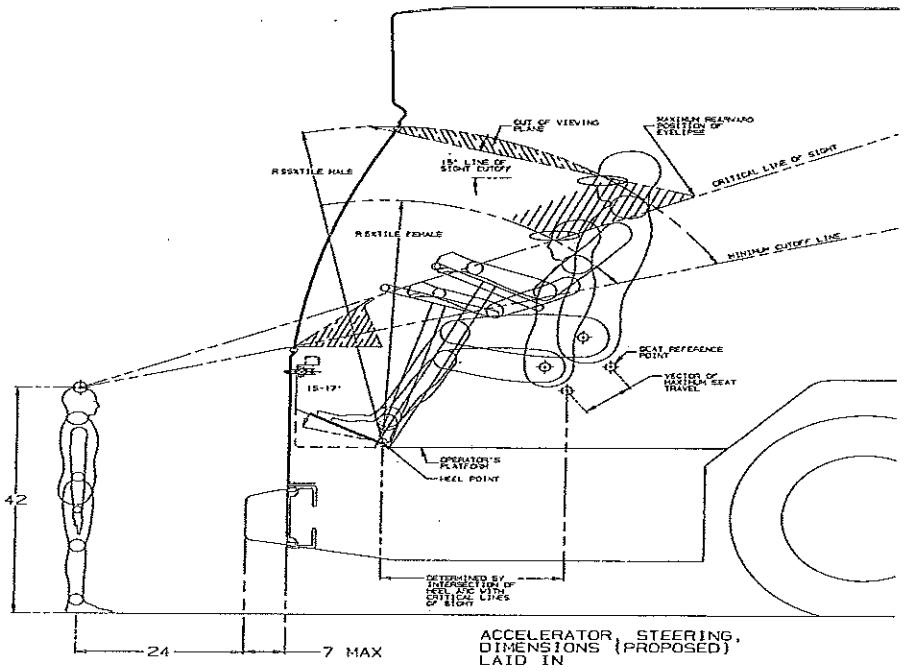


FIGURE 3
Determining Platform Height

location requiring VTA approval. In its stored location, the fire extinguisher shall be oriented so that the certification tag is visible and the trigger is not accessible. Storage location shall be in the interior of the bus within ten (10) feet of the operator's station. Where equipment is stored in a drawer, drawer shall be latched with a positive latching feature to be approved by VTA, and shall be labeled.

Fire extinguisher mounting bracket shall be an Ametek 860 or approved equal having similar or better retention of the extinguisher and Operator accessibility to it.

TS 29.3 Fare box

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

At a minimum, sufficient space shall be provided for a GFI fare box, Odyssey model, with lock riser mounting plate, and for a remote mounted keypad measuring at least 7" by 5" with 2" depth. If larger fare boxes are commonly used and commercially available, sufficient space must be provided to accommodate them.

Mounting brackets and appropriately routed cabling for the Cubic Transportation System 'Driver Console' for the "Clipper" contactless fare collection system shall be installed to the driver's upper right. Mounting brackets for the Cubic "Clipper" card reader, their 'Patron Device', must be installed near the entryway.

Location of the devised shall require the approval of VTA. Details will be provided by VTA at the pre-production meeting. Cabling shall be routed to provide easy plug-in to the necessary bus power supplies and grounds and between both of the Cubic devices.

See TS 75 for more details on fare box requirements

TS 29.4 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 30. Wheel Housing

TS 30.1 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 shall be constructed of corrosion resistant, fire-resistant material. Wheel housings, as installed and trimmed, shall withstand impacts of a 2-inch diameter steel ball, traveling at 70 MPH, without penetration or fracture.

TS 30.2 Articulated Joint

Section not used

TS 30.3 Raceway

Section not used

TS 30.4 Bellows

Section not used

TS 30.5 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.

Wheel housings shall be securely mounted and sealed to the bus body structure and they shall be isolated from dissimilar metals to prevent galvanic corrosion.

TS 30.6 Articulated Joint (Articulated Transit Coach)

NOT USED

TS 30.7 Raceway (Articulated Transit Coach)

NOT USED

TS 30.8 Bellows

NOT USED

CHASSIS

TS 31. Suspension

TS 31.1 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 31.2 Alignment

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

TS 31.3 Springs and Shock Absorbers

TS 31.3.1 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. Elastomerie 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.

The front and rear suspensions shall be pneumatic type with anti-sway bars or other appropriate equipment approved by VTA for limiting bus sway. The basic suspension system shall last the service life of the bus without major overhaul or replaeement. Replacement items such as a single bushing, shock absorber, or air

spring shall be replaceable by a 2M mechanic in 60 minutes or less. Preference will be given to installations which permit more rapid change-out times. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Necessary adjustments shall be easily accomplished without removing or disconnecting the components.

Air bags shall be Firestone, Goodyear, or other VTA approved air bag.

TS 31.3.2 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 (to be approved by VTA) on the chassis. Damping shall be sufficient to control coach motion to three cycles or less 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.

Damping shall be sufficient to control bus motion to 3 cycles or less after hitting road perturbations. Shock absorbers shall maintain their effectiveness for at least 50,000 miles in normal service. Each unit shall be replaceable by a 2M mechanic in less than 15 minutes. The shock absorber bushing shall be made of elastomeric material that will last the life of the shock absorber.

Preference will be given for properly selected Koni bus shock absorbers.

TS 31.3.3 Lubrication

All elements of steering, suspension and drive systems requiring scheduled lubrication shall be provided with grease fittings conforming to SAE Standard J534.These fittings shall be located for ease of inspection and shall be accessible with a standard grease gun 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 less than every 6,000 miles.

TS 31.3.4 Kneeling

A kneeling system shall be capable of lowering the bus a minimum of 3 inches during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the front door, by the operator using a three position spring loaded to center switch. The minimum kneeling distance maybe increased based on the step height (see TS 6.1.1). Downward direction will lower the bus. Release of the switch at any time will completely stop lowering motion and hold the height of the bus at that position. An upward push on the switch will cause the system to go to floor height without the operator having to hold the switch up.

Brake and Throttle interlock shall prevent movement while the bus is kneeling downward and when the bus is kneeled. The kneel control shall be disabled when the bus is in motion. The bus shall kneel at a maximum rate of 1.25 inches per second at essentially a constant rate. After kneeling, the bus shall rise within 2 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum acceleration shall not exceed 0.2 g and the jerk shall not exceed 0.3g/sec measured on the front door step tread.

An indicator visible to the operator 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, minimum 2 inches diameter, amber, LED, mounted near the

curbside of the front door, shall be provided that will blink when the kneel feature is activated and throughout the operation. The kneeling controls shall not be operational while the wheelchair ramp is deployed.

TS 32. Wheels and Tires

TS 32.1 Wheels

All wheels shall be interchangeable 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 shall be Alcoa, Durabright XBR with Duraflange option, forged aluminum, or approved equal having at least equivalent durability of structure and finish. Exterior surfaces of the wheels shall have a mirror bright polished luster. Wheel size shall be 8.25 X 22.5.

Wheel nuts shall be covered by bright, aluminum colored caps, Hug-a Lugs or approved equal.

TS 32.2 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 bus shall be designed to meet all operating standards while equipped with standard available lease radial tires, Goodyear, Firestone, or Michelin, with load ratings appropriate for the application and with a speed rating for continuous operation at 65 Miles Per Hour. Standard profile (non-Low profile) tires are strongly preferred.

Tires will be provided to the bus manufacture by VTA through its tire lease contractor.

TS 33. Steering (With Electric Assist)

Hydraulically assisted steering shall be provided. The steering gear shall be an integral type with the number and length of flexible lines minimized or eliminated.

Electrically driven power steering system is required.

Electrically assisted steering shall be provided to reduce steering effort (see section TS 33.2.4).

Fatigue life of all steering components must exceed 1,000,000 miles. No element of the steering system shall sustain a Class 1 failure when one of the tires hits a curb or strikes a severe road hazard at 40 MPH or slower.

TS 33.1 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 33.2 Steering Wheel

TS 33.2.1 Turning Effort

Steering effort shall be measured with the bus at GVWR, stopped with the brakes released and the electric drive 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.-lbs. and no more than 10 ft.-lbs. Steering torque may increase to 70 ft.-lbs. 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 lbs. 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 33.2.2 Steering Wheel, General

The Steering wheel shall be padded, 2 spoke, VIP or approved equal having similar comfort. It shall be sized so that the force required to turn the wheel with all steering assist systems operating does not exceed the requirements

The horn button shall protrude 1/8 inch above the steering wheel for ease of use, and shall be of durable construction requiring VTA approval. Steering wheel free-play shall not exceed 1 inch.

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 TS 45.1 and TS 48.1).Placement of steering column must be as far forward as possible, but either in line with or behind the instrument cluster.

TS 33.2.3 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 33.2.4 Steering Column 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.

The steering column shall be telescopic and tilt type, TRW or approved equal. It shall provide electric powered assist to the hydraulic power steering system, in a way similar to the TRW 'EPS' system. Approved equals must have similar performance, durability, housing size, height and telescoping range. Any failure of the electric powered assist shall result in the system defaulting to standard hydraulic power steering with no loss of steering control. System shall be wired so that the controlling ECU correctly recognizes straight wheel position even after the bus has been shut off.

TS 34. Drive Axle

The bus shall be driven by a heavy-duty axle with a 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, 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, if used, 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 34.1 Non-Drive Axle (Articulated Coach)

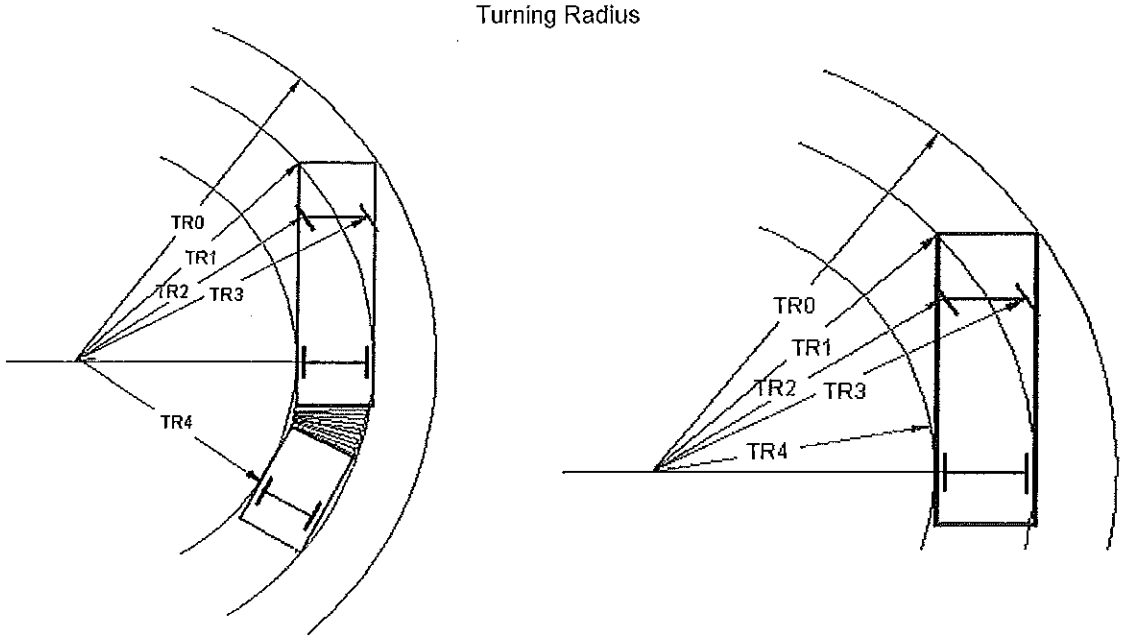
Section not used.

TS 35. Turning Radius

TABLE 4
Maximum Turning Radius

Bus Length (approximate)	Maximum Turning Radius (see Figure 4)	Agency Requirement
30 ft	31 ft (TR0)	44 ft & 1.5 in
35 ft	39 ft (TR0)	44 ft & 1.5 in
40 ft	44 ft (TR0)	44 ft & 1.5 in
45 ft	49 ft (TR0)	44 ft & 1.5 in
60 ft	44.5ft (outside front axle, TR0) 17 ft (inside rearmost axle, TR4)	44 ft & 1.5 in

FIGURE 4
Turning Radius



TS 36. Brakes

TS 36.1 Service Brake

Visible stroke indicators may be combined with electronic brake monitoring system and vehicle brake warning system to notify driver and maintenance of unsafe brake conditions.

Preference will be given to Drum brake systems. When using drum brakes, slack adjusters are required. See TS 36.3 for more details. Disc brake systems may be deemed an approved equal at VTA's sole discretion.

TS 36.2 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 50 lbs. 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. Manufacturer shall demonstrate compliance by providing a copy of a thermodynamic brake balance test upon request.

The ABS/EBC controller must support EBC1 (PGN 61441) "Brake Pedal Position" (SPN 521) to support and reduce energy consumption per mile.

Microprocessor controlled automatic traction control (ATC) shall be provided.

Brake application to maintain the bus at standstill condition on a level surface with drive in gear and all accessories off shall not exceed 5 pounds at a point 7 inches above the heel point of the pedal. All aspects of the braking system shall meet FMVSS 121 requirements.

Brake linings shall not protrude past the drum braking surface and lining thickness (or in the case of disc brakes, the pad thickness) shall be capable of being checked from under the bus in a pit. Drums shall be heavy duty flanged type of sufficient rigidity to resist vibration and distortion. Vent holes shall be provided on the rear drums. Walls shall be heavy enough to be machined 1/4 inch oversize on the diameter. Discs, if used, shall provide, at a minimum, the same life as drums.

With parking brakes fully applied, the vehicle shall remain stationary facing uphill or facing downhill on a smooth, dry Portland Cement concrete roadway with a twenty percent (20%) grade when loaded to GVWR.

The parking control valve shall be located within easy reach of the operator. The valve control shall have a molded yellow plastic grip, eight-sided and labeled with instructions for operation. Location of this brake valve shall require approval of VTA.

All lines shall be cleanly and consistently routed. Clamps shall be properly sized and rubber coated to withstand 250 degrees F temperatures, KMC Plastisol coated or approved equal.

TS 36.3 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.

The entire service brake system, excluding friction material, shall have a minimum overhaul or replacement life of 50,000 miles, rear, and 75,000 miles, front and middle (if equipped with center axle), with regenerative braking a brake retarder and on the design operating profile. Brakes shall be self-adjusting throughout this period. When using slack adjustors, preference will be given to Haldex automatic slack adjusters.

When using slack adjusters visible stroke indicators are required, BrakeSentry or approved equal having at least equivalent durability and ease of use, shall be provided to allow service personnel to easily identify when the brakes are not in correct adjustment.

TS 36.4 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 should the bus be equipped with brake drums. Brake drums shall allow machining for oversized linings 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.

A Veeder Root or approved equal hubodometer having a history of at least equivalent durability shall be installed on the curbside hub of the drive axle. The hubodometer shall be calibrated for Goodyear 12.5-22.5 transit type radial tires.

Wheel bearing seals shall run on oil type replaceable wear surfaces or a unitized seal design. Wheel bearing and hub seals shall not leak or weep lubricant for at least 100,000 miles when running on the design operating profile.

TS 36.5 Parking/Emergency Brake

The parking brake shall be a spring-operated system, actuated by a valve that exhausts compressed air to apply the brakes. The parking brake may be manually enabled when the air pressure is at the operating level per FMVSS 121. An emergency brake release shall be provided to release the brakes in the event of automatic emergency brake application. The parking brake valve will pop out when air pressure drops below requirements of FMVSS 121. The operator shall be able to manually depress and hold the emergency brake release valve to release the brakes and maneuver the bus to safety. Once the operator releases the emergency brake valve, the brakes shall engage to hold the bus in place.

TS 37. Interlocks (Transit Coach)

TS 37.1 Passenger Door Interlocks

To prevent opening rear passenger door while the bus is in motion, a speed sensor shall be integrated with the door controls to prevent the rear door 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 rear door open position, or a 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 electric drive at idle and the electric drive 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.

TS 38. Pneumatic System

TS 38.1 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 5psi 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 drive 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.

Air for the compressor shall be filtered through the main air cleaner system if applicable. Should the air compressor intake not be filtered through the main system air intake, the air intake location must be clearly described and approved by VTA, see TS 38.2. The air system shall be protected by a pressure relief valve set at 150 psi and shall be equipped with check valves and pressure protection valves to assure partial operation in case of line failures.

TS 38.2 Air Compressor

The air compressor shall be sized to charge the air system from 40 psi to the governor cutoff pressure in less than 3 minutes while not exceeding the fast idle speed setting of the drive system. At a minimum the compressor must have the capacity and durability of a Bendix TuFlo 750.

The compressor shall be an oil less electrically driven type. VTA expects the compressor to be automatically switched on and off. Only being run when the air system requires charging. Interior passenger compartment noise shall not vary more than 5 dB between the compressor being on or off. If the noise contains an audible discrete frequency, that can easily be heard in the passenger compartment the design will be deemed unacceptable. The design is subject to VTA approval, and must be submitted for engineering review before the 1st bus starts production. The air inlet for the compressor must be filtered. The filter shall be a standard type, that is easy to change. The inlet location shall be away from any heat sources, and located on the bus such that dust and road debris will not regularly be present around the intake. The filter and intake location are subject to VTA engineering approval. Detail layouts for the compressor and the air intake must be provided with the proposal submittal.

TS 38.3 Air Lines and Fittings

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844 for nylon tubing if not subject to temperatures over 200 °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:

- **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 5ft intervals or less. 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 2ft 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.

Provisions shall be made to apply shop air to the bus air systems using a standard tire inflation type valve. (Reference: this is in addition to the Quick Disconnect fitting specified in TS 41.1.4).

TS 38.4 Air Reservoirs

All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard 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 38.5 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.

The supply tank shall be equipped with both manual drain and automatic moisture ejector, Expello 35240 or an approved equal having at least equivalent durability and having identical performance characteristic. Manual drain valve to be of petcock type, Parker V402P or an approved equal having at least equivalent durability and which activates in a manner identical to the Parker.

The air dryer shall be a Bendix AD-9 or approved equal having demonstrated equivalent or superior durability, performance and ease of maintenance. The dryer activation device shall be installed to operate with the compressor. The air dryer shall be located forward of the rear axle and be accessible for servicing. Air dryer location must be approved by VTA prior to production.

ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS

TS 39. 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 bi-directional 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.

All bus data connections shall be available for output through a single on board module (Communications Hub). The vehicle may have multiple networks as needed, but all vehicle data communications shall be accessible from at least one location/module. This single communications

hub shall have multiple data output connections and include at the very least J1939 and RS232. Preference will be given to modules that provide additional output connectivity such as Ethernet LAN, USB, Wi-Fi, or other standard communications ports. The module used as the communications hub shall be programmable and configurable by VTA to output any of the available data communications on the vehicle.

In addition to the standard diagonistic ports provided, a connection to each of the vehicle networks must be provided in the main electric cabinet behind the operator's seat. The connections must be correctly terminated per J1708 or J1939 specifications and must be clearly labeled and available for use

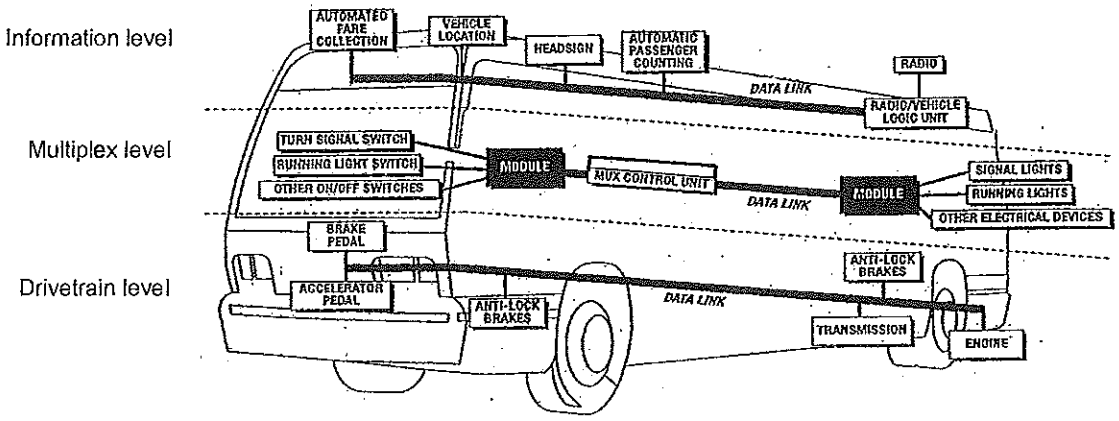
The bus shall not be equipped with a main alternator, but instead electrical current is to be supplied by the main ESS by means of a Vanner HBA device or approved equal method, such as the BAE APS level 2, having the same or greater power capacity, durability and ease of servicing. It shall be capable of providing a minimum of 300 amps. The 12/24-Volt low voltage electrical power supply system shall be provided by means of a Vanner Battery Equalizer Model 70-100CAN or approved equal having equivalent or superior durability and performance.

Precautions shall be taken to minimize hazards to service personnel. All terminals shall be insulated or covered.

Data communications systems are divided into three levels to reflect the use of multiple data networks:

- **Drivetrain level:** Components related to the drivetrain including the propulsion system components (ESS, Electric drive and control units), and anti-lock braking system (ABS), which may include traction control.
- **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, fare boxes, 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; and gateway devices.

FIGURE 5
Data Communications Systems Levels



TS 39.1 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.

Power plant wiring shall be an independent wiring harness. Replacement of the drive compartment wiring harness(es) shall not require pulling wires through any bulkhead or removing any terminals from the wires.

Each module, except the main body wiring harness, shall be removable and replaceable in less than 30 minutes by a 2M mechanic. Power plant wiring shall be an independent wiring module.

TS 40. 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. As a recommendation, no vehicle component sball generate, or be affected by, electromagnetic interference or radio frequency interference (EMI/RFI) that can disturb the performance of electrical/electronic equipment as defined in SAE J1113 and UNECE Council Directive 95/54 (R 10).

VTA shall follow recommendations from bus manufacturers and subsystem Suppliers regarding methods to prevent damage from voltage spikes generated from welding, jump starts, shorts, etc.

TS 40.1 Hardware Mounting

The mounting of the hardware shall not be used to provide the sole source ground, and all hardware shall be isolated from potential EMI/RFI, as referenced in SAE J1113.

All electrical/electronic hardware mounted in the interior of the vehicle shall be inaccessible to passengers and hidden from view unless intended to be viewed. The hardware shall be mounted in such a manner as to protect it from splash or spray.

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 sealed enclosure.

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

TS 41. General Electrical Requirements

TS 41.1 Batteries

TS 41.1.1 Low-Voltage Batteries (24V)

Batteries for the bus low voltage (12 or 24 volt) systems shall be easily accessible for inspection and serviceable only from outside the bus and in any circumstances including with the bus parked on a highly crowned road, and shall be securely mounted on a tray. Batteries shall be of premium construction and shall be fitted with threaded stud terminals. The battery terminals and cables shall be arranged to prevent incorrect installation. Battery terminals shall be located for access in less than 30 seconds with jumper cables. Two maintenance-free size 8D batteries with 3/8" stud terminals for both positive and negative shall be provided.

TS 41.1.2 Battery Cables

The battery terminal ends and cables shall be color-coded with red for the primary positive, black for negative and another color for any intermediate voltage cables. Positive and negative battery cables shall not cross each other if at all possible, be flexible and 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 shall be continuous cables with connections secured by bolted terminals and shall conform to specification requirements of SAE Standard J1127 – Type SGT, SGX or GXL and SAE Recommended Practice J541.

2100 strand 4/0 cable or greater recommended.

TS 41.1.3 Low Voltage Battery Balancer

The 12/24-Volt low voltage electrical power supply system shall be provided by means of a Vanner Battery Equalizer Model 80-100CAN or approved equal having equivalent or superior durability and performance.

TS 41.1.4 Jump Start

A jump-start junction block, Whitaker 15126 with cap 15128, shall be located in the rear compartment. Its location shall be approved by VTA prior to first bus production.

TS 41.1.5 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 vehicle shall be equipped with a 12VDC and 24VDC quick disconnect switch(es). The battery compartment door shall conveniently accommodate operation of the 12VDC and 24VDC quick disconnect switch(es).

The battery quick disconnect access door shall NOT be identified with a decal.

The battery hold-down bracket shall be constructed of a non-metallic material (plastic or fiberglass).

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 door shall be flush-fitting and incorporate a spring tensioner or equal to retain the door in a closed position when not in use.

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 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 and filled. A locking device shall retain the battery tray to the stowed position.

An illustration showing correct Battery cable routing shall be provided as a decal in an area visible when the battery tray is opened

If not located in the drive unit compartment, the same fire-resistant properties must apply to the battery compartment. No sparking devices should be located within the battery box.

TS 41.1.6 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 41.1.7 Master Battery Switch

A single master switch shall be provided near the battery compartment for the disconnecting of all battery positives (12V and 24V), except for safety devices such as the fire suppression system and other systems as specified. The location of the master battery switch shall, be accessible in less than 10 seconds for deactivation are washed off or are in normal service.

Turning the master switch off with the power plant operating shall shut off the electric drive system and sball not damage any component of the electrical system. The master switch shall be capable of carrying and interrupting the total circuit load.

The location of the master battery switch shall prevent corrosion from fumes and battery acid when the batteries are washed off. Force necessary to activate or deactivate the switch shall not exceed 5 pounds for rotary style or 20 pounds for throw style.

The batteries shall be equipped with a single switch for disconnecting both 12V and 24V power.

TS 41.1.8 Low-Voltage Generation and Distribution

The low-voltage generating system shall maintain the charge on fully charged batteries, except when the vehicle is at standard idle with a total low voltage generator load exceeding 70 percent of the low voltage generator nameplate rating.

Voltage monitoring and over-voltage output protection (recommended at 32V) shall be provided.

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 41.1.9 Circuit Protection

All circuits and wires shall be protected by circuit breakers or fuses. Fuses shall be used only where it can be demonstrated that circuit breakers are not feasible, and fuses shall be easily accessible for replacement. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for more than 30 seconds at a time to prevent overheating. The circuit breakers or fuses shall be easily accessible for authorized personnel. This requirement applies to in-line fuses supplied by either the Contractor or a Supplier. Fuse holders shall be constructed to be rugged and waterproof. All manual reset circuit breakers shall be mounted in a location convenient to VTA mechanic with visible indication of open circuits. VTA 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.

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.

Spare circuit breakers shall be provided for possible additional, post-delivery, component installations. They shall be located close to other circuit breakers and at a minimum consist of one each 12V constant power, 12V ignition power, 24V constant power and 24V ignition power.

TS 41.2 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 four ground ring/spade terminal connections shall be made per ground stud. Electronic equipment requiring an isolated ground to the battery (i.e., electronic ground) shall not be grounded through the chassis.

Grounds shall not be carried through hinges, bolted joints (except those specifically designed as electrical connectors), or power plant mountings

TS 41.3 Low Voltage/Low Current Wiring and Terminals

All power and ground wiring shall conform to specification requirements of SAE Recommended Practice J1127, J1128 and J1292. Double insulation shall be maintained as close to the junction box, electrical compartment or terminals as possible. The requirement for double insulation shall be met by sheathing all wires and harnesses with non-conductive, rigid or flexible conduit. Within the drive unit

compartment, conduit used shall be fire resistant to meet at least UL94 V2 standards and shall withstand temperatures of 300 degrees Fahrenheit, without melting.

Wiring shall be grouped, numbered and color-coded. Wiring harnesses shall not contain wires of different voltage classes unless all wires within the harness are insulated for the highest voltage present in 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. Elastomeric grommets shall be installed at points where wiring penetrates metal structure. Wiring supports shall be protective and non-conductive at areas of wire contact and shall not be damaged by heat, water, solvents or chafing. All wiring shall avoid sharp edges. Any ring terminals are to be secured with lock nuts or lock washers. All exposed electrical connections such as ring terminals shall have a light coating of dielectric grease, Permatex 67V or approved equal. Connections made through sealed crimped connector such as weather pack or duetsch do not require the dielectric grease.

Preference will be given to harness connectors that are either weather pack or deutsche. Other connector types are allowed as deemed necessary by the OEM.

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 data links 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 either use 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 7 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.

Wiring located in the drive unit compartment shall be routed away from high-heat sources or shielded and/or insulated from temperatures exceeding the wiring and connector operating requirements.

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 41.4 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 less than 40,000 hours (except cranking motors, washer pumps and wiper motors). All electric motors shall be easily accessible for servicing.

TS 41.5 Electrical Compartments

All relays, controllers, flashers, circuit breakers, and other electrical components shall be grouped according to voltage and mounted in easily accessible junction boxes of a design to be approved by VTA. The compartments shall be corrosion resistant and sealed to prevent moisture from normal sources, including drive unit compartment cleaning, from reaching the electrical components and shall prevent fire that may occur inside the box from propagating outside the box. The components and circuits in each box shall be identified and their location recorded on a wiring schematic permanently stored on the inside of the box or adhered to the box cover or door. These schematics 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. "Rear start and run" controls shall be mounted in an accessible location in the drive unit compartment and shall be protected from the environment.

TS 42. 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 32V DC on a 24V DC nominal voltage rating with a maximum of 50V DC) 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 42.1 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 42.1.1 Discrete I/O (Inputs/Outputs)

All wiring to I/O devices, either at the harness level or individual wires, shall be labeled, stamped 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 42.1.2 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.

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 42.1.3 Communications

The data network cabling shall be selected and installed according to the selected protocol requirements. The physical layer of all network communication systems shall not be used for any purpose other than communication between the system components, unless provided for in the network specifications.

Communications networks that use power line carriers (e.g., data modulated on a 24V-power line) shall meet the most stringent applicable wiring and terminal specifications.

TS 42.1.4 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 attribute 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 42.1.5 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 43. Multiplexing

TS 43.1 General

The primary purpose of the multiplexing system is control of components necessary to operate the vehicle. This is accomplished by processing information from input devices and controlling output devices through the use of an internal logic program.

Versatility and future expansion shall be provided for by expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs through the addition of new modules and/or the utilization of 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 (0V, 12V, 24V), at each module location shall be designated as spares.

Each module shall be shielded to prevent interference by EMI and RFI, and shall utilize LED's to indicate circuit integrity and assist in rapid diagnostics and verification of the load and wiring integrity. Each circuit shall be capable of providing a current load up to 10 Amperes. The internal controls shall be a solid state device, providing an extended service life. Wiring for the data bus and node module power shall consist of three, 22 gage or larger, UL approved, shielded, twisted pairs. At a minimum the system shall operate the following: All exterior lights, all interior lights, instrument lights and indicators, all operation of all the passenger doors, the kneeling system, all alarms, horns, passenger chimes, the wheelchair ramp, and the brake interlocks.

Wiring used for the multiplexing shall be stamped with the address of the corresponding I/O location. Protection of each individual circuit shall be provided. A single test button mounted at a panel at the operator's compartment area, upon activation, will provide a system check of the circuits. Failure points will be indicated by corresponding LED lights on the panel. The system shall be hosted on a personal computer using, at minimum, an Intel core Duo 2 processor supporting the Windows 2000 or later Operating System, and with enough RAM to accommodate all diagnostic software of components being proposed, as well as a handheld field diagnostic unit capable of reading the network data, control function and address data or function code. The mechanic shall be able to use either unit to check bus wire function.

A programmable controller for the system shall be located above floor level in a sealed, accessible, compartment.

The multiplex system shall have security provisions to protect its software from unwanted changes. This shall be achieved through a combination of password protection and limited distribution of the configuration software.

Provisions for updating the multiplex system program shall be possible through a PC or laptop. The program shall be web-based and license free. If the software is not free of charge, the software and 5 licenses shall be provided with the delivery of the first bus. Should the software license have a required renewal it shall be renewed by the contractor for the duration of the warranty period.

A set of parameters which can be changed within pre-defined limits shall be made available without the need to modify the program logic. The parameter settings shall reside in a separate file which can be saved and transferred to another bus with the same multiplex system for fleet consistency . The multiplex system shall have proper revision control to ensure that the hardware and software are identical on each vehicle equipped with the system. The contract shall provide necessary software and interface hardware to read and reprogram the multiplex software and firmware. Such reprogramming is to include the adding of new inputs and outputs to the system as well as changing any ladder logic in the existing system. Preference will be given to systems

that can be remotely accessed via existing onboard WLAN networks. 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 displays the most recent revision number
- A method of determining which version of the software is currently in use in the multiplex system

TS 43.2 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 43.2.1 I/O Signals

The input/output for the multiplex system may contain three types of electrical signals: discrete, analog or 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 (0-12V, 10-24V, 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 on-board components.

TS 44. Data Communications

TS 44.1 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 VTA 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 levels 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.

As a general rule all data communication must be compliant with SAE J1939, J1708 or IEEE RS232. Other communications protocols must be fully documented as listed above and be submitted to VTA for approval.

TS 44.2 Drivetrain Level

Drivetrain components, consisting of the ESS, Electric drive motor, electric drive invertor, anti-lock braking system 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.

TS 44.2.1 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, uninterrupted timing functions, drive unit voltage/current/temperature/calculated power flow in kW, drive controller/invertor voltage/current/temperature/calculated power flow in kW, ESS down to the cell level voltage/current/temperature/internal resistance/calculated SOC/calculated power flow in kW, DC-DC convertor status/Voltages/Currents/Calculated power flow in kW, and ground fault detection status. This data is to be collected and recorded at 0.5 sec intervals. The system shall at a minimum be able to store 24 hours of continuous normal operations data. The data shall be accessible via computer interface of the contractor's choice, but the data set must be downloadable by range, and time stamp. At a minimum the information must directly export to a text file for review and analysis. Preference will be given for this system to be accessible via the multiplexing system as well as those that can include additional information such as HVAC, or other sub system information.

It is also expected that the system and powertrain information listed in this section can be viewed live and be recorded while the bus is in operation.

TS 44.2.2 Programmability (Software)

The drivetrain level components shall be programmable by VTA with limitations as specified by the sub-system Supplier.

TS 44.3 Multiplex Level

TS 44.3.1 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 VTA. The communication port(s) shall be located as specified by VTA.

The multiplex system shall be fully programmable and accessible by VTA.

The awarded proposer is expected to provide a hexadecimal cross reference for all communications on any J1939 or J1708 network on the bus.

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 on-board visual/audible indicators.

TS 44.3.2 Diagnostics and Fault Detection

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. The diagnostic data can be incorporated into the information level network or the central data access system.

See training tools section for details of mock-up board requirements.

TS 44.3.3 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 displays the most recent revision number
- a method of determining which version of the software is currently in use in the multiplex system

Revision control labels shall be physically located near the programming port.

TS 44.4 Electronic Noise Control

Electrical and electronic sub-systems and components on all buses shall not emit electromagnetic radiation that will interfere with on-board systems, components or equipment, telephone service, radio or TV reception or violate regulations of the Federal Communications Commission.

Electrical and electronic sub-systems 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.

DRIVER PROVISIONS, CONTROLS AND INSTRUMENTATION

TS 45. Driver's Area Controls

TS 45.1 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 Recommended Practice 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 Recommended Practice J287, "Driver Hand Control Reach."

TS 45.2 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 45.3 Visors/Sun Shades

An adjustable roller type sunscreen shall be provided over the driver's windshield and the driver's side window. The windshield sunscreen shall be opaque and 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 to any position, 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.

The side window shall have two sunscreens, one opaque, over the rear half of the window, and the second a mesh style covering the forward half of the window. All other requirements of the windshield sunscreen shall apply to the side ones.

On the forward side of the operator barrier there shall be a durable pull-down shade. The shade shall be capable of being rolled up during daylight hours. The shade shall be dark gray, brown or black (approved by VTA prior to first bus production). This requirement will be waived if bus design includes an electronics component compartment on the wheel housing behind the operator.

TS 45.4 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 Recommended Practice 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 controls 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.

See TS 55.3 Controls for the Climate Control System (CCS) for driver HVAC control.

Operator controls for the wheelchair ramp shall be located such that both controls and ramp are visible to the operator at the same time. Controls shall be designed such that damage to the ramp or vehicle will not occur due to improper operation of the controls. Switches shall be completely weather proof and sealed from external elements. Controls shall be of the momentary type. Release of controls shall stop all ramp motions. Toggle switches are to be guarded and secured from rotation. Push-button switches shall include lighted status indicators. Control location and configuration shall require approval of VTA. The controls shall be designed to be interlocked with the bus brakes and with the accelerator or electric drive system so that the ramp cannot be deployed unless the interlock system is engaged and so the bus thereafter cannot be moved until the ramp is stowed. The interlock system control shall be located at the operator's position. The interlock system shall not be deactivated by any other control at any other location. The controls shall allow the platform deploying and stowing functions to be selected at any time without requiring either of those functions to be completed before selecting the other. Controls or other features shall prevent the operator from selecting a powered stowing function while the platform is occupied by a person.

All switches, instruments, indicators, and circuit breakers located in the instrument panel shall be easily replaceable. The connectors shall be polarized as necessary to preclude incorrect installation of the plug-in equipment. Plug-in equipment shall be securely retained to preclude working loose while in service and being easily removed by vandals.

TS 45.5 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.

An electronic LCD or approved equal display for the key operator diagnostics and gauges shall be provided. The display shall be a minimum of 6.4 inches diagonally with a density adequate to clearly display camera images.

The diagnostic LCD display shall be located in clear sight of the operator but need not be immediately in front of him. Referring to the indicator lights in Table 6, as much as practical, Red Indicator Lights shall be grouped together at the top or towards the street side of the warning light panel or module, and Yellow lights

grouped together at the bottom or towards the curbside of the panel or module. Wheelchair stop request shall be spaced apart from the standard stop request by at least three other indicators.

When the passenger exit door is open, the LCD screen shall show the exit door exterior camera view to give the operator a view of passenger exit area.

The LCD display must be fully compatible with the vehicle Programmable Logic Control system and all other electronic vehicle systems that use J1939 interfaces.

The LCD display shall include a Maintenance Mode that can test certain outputs in real time. The information on LCD screen in color graphics shall come directly from power train J1939 interface. Information about the vehicle system from electric drive, ESS, and ABS shall be capable of being shown in real time. The interface shall include all error messages, active and inactive, that have occurred on any vehicle communication network in the last 24 hours. Additionally the display shall provide direct access to all maintenance menus and features for all electronically controlled systems on the bus. Information such as broken wire, blown fuse, output current, arcing, ladder logic etc. shall be displayed on the LCD screen to help mechanic for troubleshooting.

The multi-function display shall have data logging capability so as to perform as an event data recorder in case of incidents. The data-logger is to be programmed to capture power train J1939 information, abnormal operations and intermittent problems with date and time stamp. Data shall be retrievable from the display memory, which shall have a minimum of 100 Megabytes of storage.

When in Maintenance Modes, selection of information to be displayed shall be through a "Glass ON TOP" touch screen which shall be highly scratch resistant with surface hardness of 7H, while maintaining over 80% transmittance, or approved equal having equivalent or superior durability and ease of use.

The indicator panel shall be located within easy view of the operator. A push button switch located near the indicators shall be provided to test the operation of the indicator light bulbs. The audible alarm shall be tamper-resistant and shall have an outlet level between 84 and 87 dBA when measured at the location of the operator's ear.

On-board 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 no less than 3 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 push button	Side console	Activates drive system start	
System start, rear	Approved momentary switch	Drive Unit compartment	Activates drive system start	
System run, rear	Three-position toggle switch	Drive Unit compartment	Permits running the drive system from rear start, normal front run position and off	Amber light
Drive selector	Touch panel switch	Side console	Provides selection of propulsion: forward, reverse and neutral	Gear selection
HVAC	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	Rotary, three-position detent	Side console or dash left wing	Permits supplemental ventilation: fan off, low or high	
Defroster fan	Rotary, three-position detent	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 rotary position 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, normal, unloaded	
WC ramp enable	Two-position switch[1]	Right side of steering wheel	Permits operation of ramp	Amber light
Front door kneel	Three-position guarded momentary switch	Right side of steering wheel	Controls bus kneeling	Amber light
Front door ramp	Three-position momentary switch	Right side of steering wheel	Permits deploy and stow of front ramp	Red light
Silent alarm (2 switches)	Recessed push button, NO and NC contacts momentary	Side console	1st switch: Activates emergency radio alarm at dispatch and permits covert microphone enables 2nd switch: Activates destination sign emergency message	
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	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	N/A only used on artic at VTA	
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 and clicks
Fire suppression	Red push button with protective cover	In approved location	Permits driver to override and manually discharge fire suppression system	Red light
Fare box interface	Fare box coach operator interface panel	Near fare box	Facilitates driver interaction with fare box 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, in approved location	Activates left and right turn signals	Two green lights and clicking audible indicator
PA microphone	Handheld microphone, with momentary switch on hand unit	In approved location	All Operator PA announcements	
PA interior/ exterior switch	Two position switch	In approved location	Switches PA announcements between inside and outside of bus	
Radio handset	Low-profile discrete mounting	Steering column	Radio system handset for contacting central communications	
High beam	Push button raised from other switches	Left foot panel, in approved location	Permits driver to toggle between low and high beam	Blue 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
Warning interlocks deactivated	Indicator light	Dash panel center	Illuminates to warn driver that interlocks have been deactivated	Red light
Speedo-meter	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	
Fire detection	Coach operator display	In approved location	Indication of fire detection activation by zone/location	Bell and red light

Door obstruction	Sensing of door obstruction	Dash center	Indication of rear door sensitive edge activation	Red light and buzzer
Low system air pressure	Sensing low primary and secondary air tank pressure	Dash center	Indication of low air system pressure	Buzzer and red light
Drive system cooling indicator	Low coolant indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects low coolant condition	Red light
Hot ESS indicator	temperature indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects hot ESS condition and initiates time delay shutdown	Red light
Hot drive system indicator	Coolant temperature indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects hot drive system condition and initiates time delay shutdown	Red light
High Voltage system Fault	High Voltage system indicator may be supplied as audible alert and visual and/or text message	Within driver's sight	Detects High voltage system faults, and initiates a full system shutdown and battery disconnect	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 light
Charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects no charge condition, and initiates time-delayed shutdown	Red light flashing or solid based on condition
Charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects high charge condition, and initiates time-delayed shutdown	Red light flashing or solid based on condition
Charging system indicator (12/24 V)	Detect charging system status	Dash center	Detects low charge condition	Amber light
ESS SOC	Analog gauge display, graduated and low SOC indicator light	Dash center	Indication of ESS state of charge (SOC)	Amber light
Dash Brightness	Rotary switch	In appropriate location	Controls the light level on the dash	
Passenger chime system	Toggle switch	Side console	Turns the chime system on or off	
Operator's overhead light	Toggle switch	Side console	Turns on light over operator	
Fare box overhead light	Toggle switch	Side console	Turns on light over fare box	
Test for warning	Push button, momentary	Near warning lights	Turns on all warning lights for bulb inspection	

lights				
Dash fans (2)	(2) Toggle switches	Side console	Individually turn on (2) dash mounted cage style fans	
HVAC panel	Sealed push button	In approved location	Sets the HVAC temperature	
Parking Brake	Specialized push switch	Side console	Sets and releases parking brakes	
Parking brake applied	Indicator light		Indicates parking brake set	Red light
Brake applied	Indicator light		Indicates service brakes applied	Red light
Front door air	Toggle air switch	In approved location	Supply/dump switch to front door air	
Wait to start	Indicator light	In approved location	Indicates bus electric drive is not yet ready to be started	Gray light
Stop Request	Indicator light	In approved location	Passenger wishes to deboard	Green light
ADA stop request	Indicator light	In approved location	Wheelchair Passenger wishes to deboard	Blue light
Stop request Brightness	Rotary switch	In appropriate location	Controls the light level of the ADA stop request light	
Speed Switch	Indicator light	In approved location	Shows speed switch for interlocks, etc. is activated	Amber light
Regen needed	Indicator light	In approved location	Exhaust system becoming plugged	Amber light
Hydraulic Fluid	Indicator light	In approved location	Low Hydraulic fluid	Red light
Door low air	Indicator light	In approved location	Low air to the doors	Amber light
Assorted drive warnings	Indicator lights	In approved location	Indicates issues with electric drive system or motor, depends on manufacturer's requirements	Amber or red as appropriate
Fasten seat belt	Indicator light	In approved location	Indicates operator seat belt unfastened	Amber light
Exit door	Indicator light	In approved location	Indicates exit door is not locked	Red light
Communica-tions fault	Indicator light	In approved location	Issue with bus multiplex system	Red light
Check System	Indicator light	In approved location	Indicates a drive system or other high voltage system problem	Amber light
Check 12V system	Indicator light	In approved location	Bus 12V system not properly performing	Amber light
Aux brake applied	Indicator light	In approved location	Brake retardation/regeneration occurring	Amber light

NOTE: VTA has endeavored to make the table comprehensive, if there is any disagreement between the table and the specifications, the specifications will prevail.

TS 45.6 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 45.6.1 Pedal Angle

The vertical angle of the accelerator and brake pedal 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 degrees at the point of initiation of contact and extend downward to an angle of 10 to 18 degrees 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 45.6.2 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 45.7 Brake and Accelerator Pedals

The brake and throttle pedals shall be mounted on an electrically powered adjustable plate that shall simultaneously slide the pedals back and forth for a minimum of 3 inches of fore-aft travel. The adjustment shall be controlled by use of a dash mounted guarded toggle switch. The switch shall be clearly labeled to identify it as pedal adjustment and shall be within easy reach of the driver. The adjustable pedal system shall be Kongsberg or approved equal having comparable durability in service and self-cleaning ability of the slide mechanism.

Pedal travel of the pedals shall be limited by stops underneath. Surfaces in the area where the operator's heel may be planted for pedal operation shall be non-skid and permanently installed.

The angle of the brake pedal shall be determined from a horizontal plane regardless of the slope of the cab floor. The brake pedal shall be positioned at an angle of 27-35 degrees at the point of initiation of contact, and extend downward to an angle of 20-28 degrees at full depression.

The floor mounted brake pedal shall be 10" - 12" long and 3" - 4" wide. 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".

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. The brake pedal shall have a 0-degree lateral angle, and the accelerator shall have a 12-degree lateral angle to coincide with the position of the operator's leg as it moves outward to operate the accelerator pedal.

TS 45.8 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 degrees and a maximum of 37 degrees. It shall be located no closer to the seat front than the heel point of the accelerator pedal.

Turn signal controls shall be floor-mounted, foot-controlled, water-resistant, heavy-duty, momentary contact switches.

Floor switches must be easily accessible to the operator without requiring movement of the operator's torso from the designed sitting position.

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 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.

TS 46. Driver's Amenities

TS 46.1 Coat Hanger

An operator's coat hook and coat strap shall be furnished and installed by the Contractor at the operator's platform area. A leather strap with Velcro fastening shall be installed to prevent coats from swaying. The design and location shall require approval of VTA.

TS 46.2 Drink Holder

No drink holder shall be provide.

TS 46.3 Storage Box

A storage compartment for the operator's personal belongings shall be provided convenient to the operator's area. This compartment shall be a minimum 20 X 15 X 10 inches. The compartment shall be free from protrusions and shall have a closeable door with 5/16 inch square key latch. Storage compartment including location shall require VTA approval. A copy of the proposal shall accompany the seating layout proposal.

TS 46.4 Paddle Clip

A spring-loaded clip and mounting surface capable of accommodating a 8 ½" X 5 ½" operator's paddle lengthwise shall be provided at a convenient location forward of the operator in a position for easy visibility by the operator. Exact location shall require VTA approval.

TS 47. Windshield Wipers and Washers

TS 47.1 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.

A variable-speed feature shall be provided to allow adjustment of wiper speed for each side of the windshield between approximately five (5) and twenty-five (25) cycles per minute.

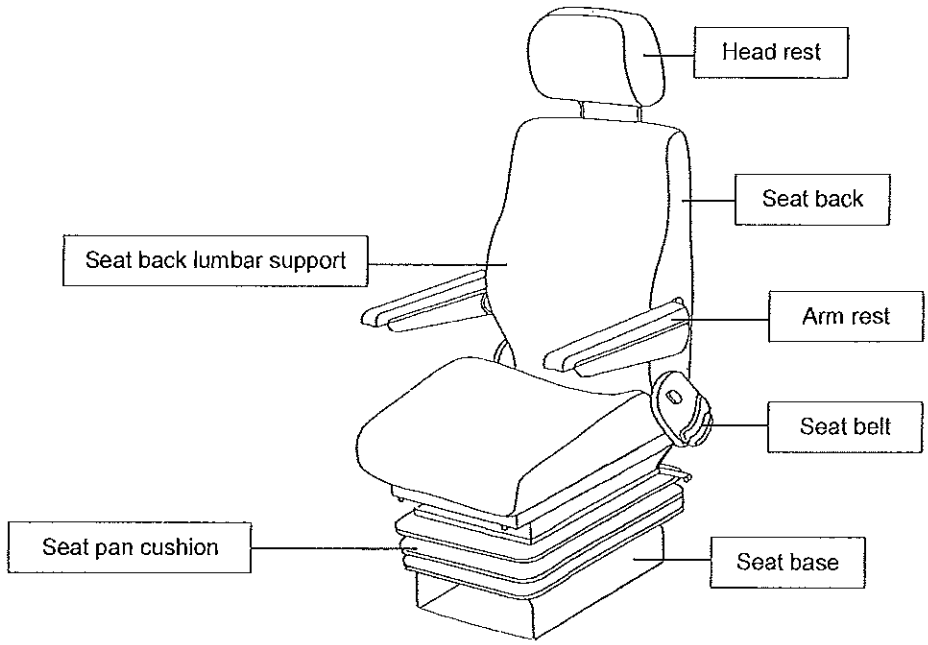
TS 47.2 Windshield Washers

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 48. Driver's Seat

FIGURE 6
Driver's Seat



TS 48.1 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.

The operator's seat shall be a USSC Model G2A Evolution pneumatic (air suspension) high back or approved equal having similar driver comfort and durability.

TS 48.1.1 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.

TS 48.1.2 Seat Pan Cushion Height

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 48.1.3 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 degrees). The seat pan shall adjust in its slope from no less than plus 12 degrees (rearward "bucket seat" incline) to no less than minus 5 degrees (forward slope).

TS 48.1.4 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 than6 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.

The mechanism for forward and rearward travel of the seat shall be released by a driver controlled air valve-located on the seat. An adjustable headrest shall be provided and shall be covered on the sides with the same material as the seat cushion and on the head contact surface with coordinating dark vinyl. The headrest must be secured in such a way that it cannot be removed without partial dismantling of the seat back but can be removed by a 2M mechanic in 10 minutes or less.

TS 48.1.5 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 48.1.6 Seat Suspension

The driver's seat shall be appropriately dampened to support a minimum weight of 380 lbs. The suspension shall be capable of dampening adjustment in both directions.

The seat shall have a suspension travel lock out feature. Once the seat height is adjusted, the travel lock out feature will hold the seat in place and prevent it's suspension from moving.

Rubber bumpers shall be provided to prevent metal-to-metal contact of any internal moving parts of the seat.

Under no normally adjusted seat position shall the Operator's seat "bottom out." The air supply connection to the seat shall have a quick disconnect provision at the back of the seat.

TS 48.1.7 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.

Position

The Operator's seat shall be located such that the seat back cushion in the uncompressed condition is 22 inches from the most rearward part of the steering wheel. This condition is with the steering wheel in the middle tilt position, the seat in the rearmost and lowest position and seat back in the middle tilt position.

TS 48.1.8 Headrest

Adjustable headrest to be provided

TS 48.1.9 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 48.1.10 Seat Back Angle Adjustment

The seat back angle shall be measured relative to a level seat pan, where 90 degrees is the upright position and 90 degree-plus represents the amount of recline.

The seat back shall adjust in angle from a minimum of no more than 90 degrees (upright) to at least 105 degrees (reclined), with infinite adjustment in between.

TS 48.2 Seat Belt

The belt assembly shall be an auto-locking retractor (ALR). All seat belts should be stored in automatic retractors equipped with internal mechanisms to prevent cinching of the belt around the driver during the normal duty cycle. 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.

Seat belts shall be provided across the operator's lap and diagonally across the operator's chest. The operator shall be able to use both belts by connecting a single buckle on the right side of the seat cushion, but the operator at his/her discretion shall be able to disconnect the diagonal portion without affecting the location or performance of the lap portion of the belt assembly.

TS 48.3 Adjustable Armrest

No armrests

TS 48.4 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 48.5 Seat Structure and Materials

Cushions

Cushions shall be fully padded with at least 4 in. of materials in the seating areas at the bottom and back.

Upholstery shall be ventilated transportation grade fabric, Holdsworth Camira Vigor quality, color black, and shall pass a Martindale abrasion test at 12 kPa and 200,000 cycles with no pile pullout. Vinyl on headrest shall be dark blue to match fabric. Foam and fabric shall meet FTA Docket 90A.

TS 48.6 Pedestal

Black powder-coated steel.

TS 48.7 Seat Options

The bus horn shall sound constantly, after a one second delay, whenever the following conditions are met: The seat is unoccupied, the service brakes are not applied, the parking brake is not set, the bus is in drive or neutral and switched power is on. The horn shall shut off immediately whenever any of the conditions listed is resolved.

TS 48.8 Mirrors

TS 48.8.1 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 breakaway mounting system.

The bus shall be equipped with electric remote control, heated, corrosion resistant, outside rear view mirrors, with quick release replaceable mirror glass. An electrical quick connect shall allow the changing of the mirror head without entering into the bus. The mirrors shall meet FMVSS requirements. Mirrors shall permit the operator to view the highway along both sides of the bus, including the rear wheels. A 3" X 5" manually adjustable convex mirror, shall be located on the street side mirror, securely attached below the housing. Mirrors shall be firmly attached to the bus to prevent vibration and loss of adjustment, but not so firmly attached that the bus or its structure is damaged when the mirror is struck in an accident. The mirrors shall be located such that there is no obstruction in the view of vision. The street side rearview mirror shall be mounted such that the lower edge is no less than 40 inches above the street surface. This is intended to be a "low mount" style mirror. The curb-side rearview mirror shall be mounted so that its lower edge is no less than 1.88 meters (74 inches) above the street surface. The street side mirror shall be approximately 8" x 8"

and mounted so that from the Operator's eyelipse position there is a visible gap between the housing and the "A" Post. Mirror location shall be approved by VTA. Controls for the mirrors shall be by four way momentary switches located in a position convenient for operators in the range from 5th percentile female to 95th percentile male. Reflective surface of the mirror glass must not be on the exposed side where bus wash brushes can scratch and damage it. An additional switch to activate a heating system for the mirror surfaces shall also be provided.

TS 48.8.2 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.

Mirrors shall be provided for the operator to observe passengers throughout the bus, including areas behind modesty panels, without leaving his seat and without shoulder movement. With a full standee load, including standees in the vestibule, he shall be able to observe passengers in the front and rear doorways, anywhere in the aisle, and in the rear seats. Inside mirrors shall not be in the line of sight to the right outside mirror. The mirror locations shall not present a safety hazard for passengers or obstruct the opening of compartment doors.

At a minimum, the following shall be provided:

A) One interior rearview mirror shall be mounted ahead of, and above the operator's eyelipse position to provide a general view of the interior of the bus. Mirror shall be flat with a 8 X 16 inches viewing area. In its mounted position, the mirror shall be fully adjustable and secured from vibration. The mirror, bracket and fasteners shall require approval of VTA.

B) Three interior flat mirrors shall be mounted in the upper curbside corner of the bus which shall be of suitable size to provide the operator a clear and full view of the front doorway area and the rear doorway mirror. The mirrors shall be positioned to provide a clear line of sight to the doorway mirrors (no obstructions). The mirrors and the brackets with fasteners shall require approval of VTA.

C) One interior mirror shall be mounted near the rear door so as to provide the operator a clear view of both doorways by looking in the mirrors mounted over the windshield header panel. The mirror shall be convex 12 inches in diameter. Method of mounting mirrors shall require the concurrence of VTA. No wing nut shall be used for securing of the mirror arm from turning in its bracket. If a ceiling mount is used, it shall be held by tapping plates. The mirror and bracket with fasteners shall require the approval of VTA.

D) A convex mirror mounted inside the bus on either the windshield post or the headliner shall provide the operator with a means of seeing if the front bike rack is deployed even when no bicycles are present. Location will require approval of VTA.

WINDOWS

TS 49. Windows General

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.

TS 50. Windshield

The windshield shall permit an operator's field of view as referenced in SAE Recommended Practice J1050.The vertically upward view shall be a minimum of 14 degrees, 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 degrees 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 degrees angle in the operator's field of view. Windshield pillars shall not exceed 10 degrees of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

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.

Preference will be given to sloped front BRT style windshield.

TS 50.1 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.

Two-piece front windshield shall be provided.

TS 51. 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 operator's side window glazing, should extend a minimum of 33 in. 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. 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 laminated 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.

The operator's side window shall be fully open able in half sections without rocking, binding or jamming. Each window section shall slide horizontally in tracks or channels designed to last the service life of the bus (a minimum of 12 years) and shall not have a latch but shall have a mechanism to prevent movement during normal bus operation. Where a sash frame is used, the sash frame lower rail shall be designed to drain water

to the exterior of the bus. The operator's side window shall not be bonded in place and shall be easily replaceable.

Glazing shall be Thermoguard Bluespruce1-AS2 laminated or approved equal meeting all VTA specifications and having the same or lower UV and infrared transmittance while having the same or higher visible light transmittance.

TS 52. Side Windows
TS 52.1 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 drive system operation or normal road excitation is not apparent. All aluminum and steel material will be treated to prevent corrosion.

Passenger side windows shall extend from the shoulder height of a 5th percentile, seated, female passenger to at least the eye level of a 95th percentile, standing male passenger. Vertical mullions between windows including the frames, as viewed from inside the bus shall not exceed 10 inches in width. Preference will be given for more narrow mullions which result in greater passenger visibility. Viewed from the exterior, the windows shall be 'continuous' style, presenting a smooth surface with no mullions visible. The upper section of each window, except those with destination signs, shall have a flip-up style insert window to provide passenger ventilation when the HVAC system is not functioning. The insert window opening shall be at least 50 square inches and it shall seal thoroughly when closed. Where destination signs are used, the upper portion of the window shall be designed to facilitate viewing and servicing of the sign, and shall be untinted and may be hinged.

All fasteners used on the window frames and hardware shall be stainless steel.

All side windows shall be of the smooth flush mount "BRT" style, also referred to as "seamless windows."

TS 52.2 Emergency Exit (Egress) Configuration

Every window shall be capable of being made an egress window

Window emergency exits shall be of the bottom opening, top hinged type and shall meet all provisions of FMVSS 217. The catch mechanism for emergency operation shall be positively latched to prevent accidental opening but shall not interfere with emergency use. All windows shall be emergency exits except for the last window on each side.

Emergency opening instruction plates, made of metal, shall be furnished and installed by the builder with rivets below each side window and each cross seat position. Emergency escape instructions shall be in English, Spanish, and Vietnamese.

TS 52.3 Configuration

Operable Windows with Inward-Opening Transom Panels (Fixed Bottom, Tip-In Top)
Each operable side window shall incorporate an upper transom portion. The transom shall be between 25 and 35 percent of the total window area. The lower portion of the window shall be fixed. The transom portion shall be hinged along the lower edge and open inward.

TS 52.4 Materials

Anti-Vandalism Sacrificial Liner

All glazing material aft of the standee line shall be equipped with necessary bracketry, fasteners and clear acrylic liner that shall be easily removable in the event of vandalism. The acrylic material shall be clear and shall have minimal effect on the transmittance of the underlying glazing. This material shall not be adversely affected by ultraviolet rays and shall withstand normal cleaning practices. The installation of the liner shall prevent clouding or fogging. A mechanic shall be able to easily remove and replace the acrylic liner without the use of any specialized tools in 5 minutes or less.

The inner face of each passenger window shall be protected from graffiti by a clear acrylic sheet that is removable without removing the window glass. Time to remove and replace individual sheets shall be less than 5 minutes. Sheets shall be no more than 1/8 inch in thickness, and shall meet the requirements of FMVSS 302. Removal and replacement of the sheets shall not require the removal or modification of any other parts or fasteners, and must not result in damage to the retaining system or to any parts on the bus.

SHGC and light transmission performance shall be defined by the National Fenestration Rating Council.

Window Glazing Material

Windows in the bus sides and in the rear door shall be a minimum of ¼ inch thick laminated safety glass and shall be tinted a gray color. The material shall conform with the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673. The maximum solar energy transmittance shall not exceed 39 percent, as measured by ASTM E-424, and the luminous transmittance shall be no less than 70 percent as measured by ASTM D-1003. Glazing shall be Thermoguard laminated or approved equal meeting all VTA specifications and having the same or lower UV and infrared transmittance while having the same or higher visible light transmittance.

TS 52.5 Rear Window

No requirement for rear window

TS 53. Heating, Venting, and Air Conditioning, 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.

HVAC equipped. See below for configuration & specifications

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 a range 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 10 to 95 °F and at any ambient relative humidity levels between 5 and 50 percent.

When the bus is operated in outside ambient temperatures of 95 to 115 °F, the interior temperature of the bus shall be permitted to rise 0.5° for each degree of exterior temperature in excess of 95 °F.

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

System capacity testing, including pull-down/warm-up, stabilization and profile, shall be conducted in accordance to the APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System."

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

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

The air-conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110 to 80 °F in less than 20 minutes after system start-up. Drive system and ESS temperature shall be within the normal operating range at the time of start-up of the cool-down test. During the cool-down 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 August 21, shall be used. There shall be no passengers on board, and the doors and windows shall be closed.

Interior climate control system shall maintain the interior of the bus at a level suitable for all climatological conditions found in the continental United States.

The cooling mode may operate independently of the propulsion system and outside air may be cut off during the cool down period.

With the climate control system in the air conditioning mode, all operator compartment heating shall be turned off. Separate air vents shall be located in the operator's compartment to provide fresh air for the operator's feet. Air flow shall be at least 20 cubic feet per minute at 20 MPH vehicle speed and 35 cubic feet per minute at 40 MPH.

TS 54. 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.

All HVAC pumps are to be brushless and seal-less having a minimum maintenance-free service life for both the brushless motor and the pump of at least 40,000 hours at full power.

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.

The climate control system air conditioning shall be provided by Thermo-King T14-M3 TE series all electric unit or approved equal having equivalent or superior demonstrated performance, durability and ease of maintenance. Unit shall include a scroll compressor or compressors, integral to the all-electric unit. The unit must be mounted in a way compatible with the Electric power system shall be located to allow customary ease of access for maintenance.

The unit shall be driven on electric power only, or via a high voltage distribution system from the ESS. Engine belt connected compressors will not be allowed. Separate electric generator systems for the HVAC system will not be allowed.

The Air Conditioning system shall be provided with a programmable microprocessor based controller. The controller's digital inputs shall accept signals from standard switches or programmable logic control outputs. The controller shall provide continuous monitoring of the A/C system's critical pressures and temperatures, compressor, bus interior temperature and ambient temperature. The yellow A/C dash warning light shall activate anytime the controller monitoring system shuts the unit down because of a malfunction, out of limit condition, or electrical failure.

When the A/C system is ON, the controller shall continuously monitor temperatures of the bus return air, A/C unit discharge air, ambient air, refrigerant discharge gas and the evaporator coil. The controller will also monitor high-pressure and low-pressure cutout switches and measure critical temperature differentials of the A/C unit. If pressures or temperatures approach out of limit conditions, the controller will take corrective action to protect system components. The controller shall provide diagnostic codes so that maintenance personnel can monitor the A/C unit's critical operating parameters. Logged alarm codes shall be read and cleared, and diagnostics performed, by first turning on a keyed switch located on the control panel in the return air area of the HVAC unit. The key switch shall activate all the functions (diagnostic, failure codes, etc.) of the Operator's display panel. A key will be required with every bus, and all the diagnostic activation switches shall be keyed alike.

The climate control system shall be highly reliable since most failures are Class 2.

The compressor or compressors shall be installed such that time for removal and replacement of the compressor(s) shall not exceed 4.0 hours.

Provisions must be made to assure that condensation on A/C lines or components does not drip, drain or otherwise enter the passenger area of the bus.

Test ports for system pressures, electrical and diagnostics shall be easily accessible and no more than 90 inches from ground level.

The refrigerant shall be R-134A or R407. A label shall be provided near the charging ports that shall identify the refrigerant that is to be used.

Temperature control within the bus shall be through a reheat system.

The energy source for the heating system shall not come from any combustion source on board the vehicle. Energy generation for the heating of the bus and defrosting of the front window shall show similar performance as the previously mentioned Thermo-King unit.

TS 54.1 Auxiliary Heater

Not required

TS 55. Air Flow

TS 55.1 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 ft. 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.

TS 55.2 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 Recommended Practice 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 55.3 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 VTA, 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 VTA project manager.

The switch to control the heating, ventilation and air conditioning system shall be a four position switch indicating 'OFF', 'VENT', 'HEAT' and 'A/C', conveniently located to the operator. In the heating and cooling modes, the system will automatically maintain the temperature selected by the operator. The Operator shall be capable of adjusting the bus interior set point within + or – 5 degrees of the preset temperature using a display panel located on the Operator's instrument panel. The display panel shall be part of the microprocessor based HVAC control system and its functions shall be limited in normal use to allowing only access to the temperature adjustments.

The operator's Control knob must be secured to the shaft such that no loosening occurs over the life of the bus.

TS 55.4 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 to the foot area on both sides of the steering column. 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. VTA will consider vehicles that can only provide fresh air to either or the foot or head area to be the same as those being able to provide both. However, preference will be given to those that can provide both.

TS 55.5 Driver's Cooling

With the climate control system in the air conditioning mode, all operator compartment heating shall be turned off. Separate air vents shall be located in the operator's compartment to provide fresh air for the operator's feet. Air flow shall be at least 20 cubic feet per minute at 20 MPH vehicle speed and 35 cubic feet per minute at 40 MPH.

Two fans shall be provided near the operator controlled by individual switches convenient to the operator. One fan is to be directed to provide additional defrost capability, the other is to be directed towards the operator to provide additional cooling.

When the fan switches are "on" they shall be wired to automatically shut off whenever the front door is open, and to re-start when the door is closed.

TS 56. 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.

All filters shall be of the disposable type.

TS 57. 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. They shall be captive and resettable from inside the bus, when released, and shall be easily opened and closed manually by one person.

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. The location, design, construction and operation of the ventilators/hatches shall require concurrence of VTA, and shall include provisions for a 50 percentile female to reach the hatch from the low floor. A decal giving operation instruction shall be installed at each ventilator/hatch. Decal shall be trilingual (English, Spanish and Vietnamese).

TS 58. Maintainability

Manually controlled shut-off valves in the refrigerant lines shall allow isolation of the compressor and dehydrator filter for service. To the extent practicable, self-sealing couplings utilizing O-ring seals shall be used to break and seal the refrigerant lines during removal of major components, such as the refrigerant compressor. Shut-off valves may be provided in lieu of self-sealing couplings. The condenser shall be located to efficiently transfer heat to the atmosphere and shall not ingest air warmed above the ambient temperature by the bus mechanical equipment, or to discharge air into any other system of the bus. The location of the condenser shall preclude its obstruction by wheel splash, road dirt or debris. HVAC components located within 6 in. of floor level shall be constructed to resist damage and corrosion.

High and low refrigerant pressure electronic gauges to be located in the return air area.

TS 59. Entrance/Exit Area Heating

No requirements for entrance/exit area heating

TS 60. Floor-Level Heating
TS 60.1 Transit Coach

No requirement for floor-level heating.

EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING

TS 61. 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 anybody 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.

Proof of bus crashworthiness testing shall be furnished with the proposal package.

The exterior designs shall showcase BRT style features; such as, sloped windshields, integrated headlights, and roof faring even height over the full length of the bus.

TS 61.1 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.

All materials used for the manufacture of the buses and other items supplied under this contract shall be new.

A. All rubber parts shall be compounded and cured such that they will perform satisfactorily at any temperature which may be encountered in bus operation, and shall have the longest possible commercial life consistent with obtaining the required characteristics.

B. For all parts which have rubber bonded (cured) to metal, any separation between metal and rubber shall be considered a defect in material and/or workmanship.

C. Rubber glazing retaining strips shall be designed such that they will retain the glazing in the bus and provide a watertight seal without the use of sealant or filler materials.

D. All piping, tubing, cables, and wiring shall be properly supported and grommetted. Where tubing is bent, bending shall not flatten tubing.

E. Tube fittings shall be Aeroquip or approved equal.

F. All rubber seals shall be secured in approved shaped channels to firmly hold rubber seals in place.

G. All insulating material shall be fire-resistant and self-extinguishing.

H. All cap screws, nuts, washers and bolts shall be zinc plated or stainless steel. The thickness and method of coating shall conform to ASTM Specification F1135, latest revision, Grade 3 coating for Grade 5 fasteners (metric grade 9.8), Grade 4 coating for higher Grade fasteners. Color code 'A' is to be used for all coatings.

I. Where practical and necessary, bolts, nuts, and screws shall be locked with lock washers or the use of self-locking nuts. Self-locking nuts shall be visually identifiable. Wheel lug nuts are not included.

J. All fasteners shall be SAE standard size. Fasteners shall be Grade 5 (metric grade 9.8) material unless the application requires a higher grade fastener. All fasteners shall be properly identified as to their Grade in accordance with SAE J429. The shortest standard size bolt shall be used which will provide a minimum projection of two full threads past the nut.

TS 61.2 Roof-Mounted Equipment (Transit Coach)

A non-skid, clearly marked walkway or steps shall be incorporated on the roof to provide access to equipment without damaging any system or bus paneling.

TS 62. Pedestrian Safety

Exterior protrusions along the side and front of the bus greater than ½ in. and within 80 inch 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.

A guard to deflect fallen pedestrians away from the rear wheels shall be provided in front of the curbside rear wheels. The guard shall be an S-1 Gard or approved equal having similar or superior effectiveness, durability, ease of installation, clearance, and impact on wheel and brake servicing.

TS 63. Repair and Replacement
TS 63.1 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.

TS 64. 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.

The bus design shall not allow water to drip or splash onto waiting passengers standing at the curb.

TS 65. License Plate Provisions

Provisions shall be made to mount standard-size U.S./Canada license plates per SAE J686 on the front and rear of the bus. These provisions shall direct-mount or recess the license plates so that they can be cleaned by

automatic bus-washing equipment without being caught by the brushes. The rear license plate provision shall be illuminated per SAE J587.

Location to be approved by VTA.

TS 65.1 Rub rails

No requirement for rub rails.

TS 66. 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 66.1 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 and shall not interfere with the changing of shock absorbers or with any other component. 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)

Conventional or pantograph hinged doors shall be used for the drive unit compartment and for all auxiliary equipment compartments, including doors for checking the quantity and adding to the electric drive coolant, system lubricant and other fluids. 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 over-center 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 Door Latch/Locks

Access doors larger than 100 square inches shall be equipped with locks that can be opened by the operator's door key. Door key to be a nominal 5/16" square.

Provisions must be made to protect exterior surfaces from damage when any access door is opened. Contractor shall provide design and material of door at time of approved equal submittal. Design and materials shall require approval of VTA. Where doors are used to check fluids, fluid additions shall be made through the same doors.

The drive unit compartment door shall not require more than 25 lb. force to open. Gas filled springs shall be used for the drive unit compartment door and shall be capable of keeping the door open without a prop.

The battery compartment shall prevent the accumulation of snow, ice, mud and debris on top of the batteries and within the compartment area.

The edge of the door shall be insulated to prevent the batteries from shorting if the door inadvertently closes while the tray is in an out position.

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 lbs. 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 degree angle to the longitudinal centerline of the bus. The energy absorption system of the bumper shall be independent of every power system of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than 7 in.

Mounting provisions for integrated bike rack must be provided.

Contractor shall provide appropriate stand-off brackets for mounting of a Sportworks bike rack to front bumper.

Contractor shall provide the necessary harnessing and connection to bus multiplex system for up to 3 bike position sensors for the 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 1in. high, and at accelerations up to 2 mph/sec. The rear bumper shall protect the bus when impacted anywhere along its width by the common carriage with contoured impact surface

defined in Figure 2 of FMVSS 301 loaded to 4000 lbs., at 4 mph parallel to or up to a 30 degree angle to the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude unauthorized riders standing on the bumper. The bumper shall 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 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.-lbs. 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.

Paint shall be acrylic urethane material compatible with VTA's repair shop paint, DuPont Centari 5000. Surface preparation shall be conducted as required by the paint manufacturer, and only materials approved by the paint manufacturer shall be used.

Paint colors must match samples that will be provided at time of pre-production meeting. Pantone designated shades will also be provided.

Chemical reducers and primers shall be compatible with the paint and as required by the paint manufacturer and approved by VTA.

Paint thickness shall be sufficient to achieve the specified color match on all surface areas and to meet the appearance and performance requirements.

Removal and replacement of VTA's exterior advertising shall not damage the painted surfaces.

Painting shall not be done when temperatures are less than 60 degrees Fahrenheit.

VTA's paint scheme is:
White base color
Blue stripe below windows, continuous around back
Red stripe below blue stripe, continuous around back
Black, high glass, for trim at windows and doors and as approved by VTA.

TS 70. Decals, Numbering and Signing

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.

The Contractor shall install interior and exterior signs in the general locations as specified by VTA. The exact language and location shall be determined by VTA prior to bus manufacture. VTA will provide a bus interior decal and color layout standard.

VTA shall work with the Contractor to determine language and/or artwork for the following decals which shall be procured and installed by Contractor:

Pull cord to stop
Welcome aboard
Wheelchair accessible sign (icon only)
Stand behind yellow line
Exit to rear
Fire extinguisher
Wheelchair/disabled priority seating (ADA required)
Watch Your Step
Emergency Window exit instructions
Wheelchair/elderly priority seating (VTA language)
Break glass pull handle emergency door exit
Escape hatch instructions
Keep all body parts out of window
Exit door instructions
Emergency exit at next window to front
Do not stand against door

Press to signal (chime for wheelchair locations)
Place hand to open (at exit doors to activate opening)
(2) identical signs in each vehicle identifying that the bus may be under surveillance

All of these decals shall be trilingual (English, Spanish and Vietnamese). Exact wording, size, location and colors shall require approval of VTA. The Contractor shall inform VTA of any other decals which the Contractor believes to be useful or necessary for the buses as configured.

Preference will be given to decals that are info graphics with text being used only when absolutely necessary. Any decal text must be sized large enough that it can be easily read at night with the interior bus lights on by a person with 20/20 vision at 10 feet away.

The Contractor is to conform interior paint and coloring layout to VTA's interior bus layout standard. The VTA standard addresses items including, but not limited to, decals and grab handles. The standard is available upon request.

Bus numbers shall be 4 +or- ¼ inch Futura Regular, in a contrasting color colored to the painted surface beneath the decal, dark blue against a light surface and white against a dark surface.. Bus numbers will be applied in 6 locations, with exact locations to be determined at the pre-production meeting. The California Vehicle Carrier ID number shall be 2 +or- ¼ inch Helvetica medium colored black. The ID number is CA44146.

Roof top bus numbers are to be provided, not less than 22.5 inches tall. Color to be white or black, depending on which offers the most contrast to the roof surface color, material to be 3M Controltac with 7 year life rating.

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.

All interior signage is subject to VTA approval.

TS 71. Horn

The electric horn shall be a Spartan Engineered Products Model Number A010242 or approved equal having at least equivalent durability and equivalent volume.

TS 72. 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 rear 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 utilized at all exterior lamp locations.

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 72.1 Backup Light/Alarm

Visible and audible warnings shall inform following vehicles or pedestrians of reverse operation. Visible reverse operation warning shall conform to SAE Standard J593. Audible reverse operation warning shall conform to SAE Recommended Practice J994 Type C or D.

TS 72.2 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 foot-candle 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 72.3 Turn Signals

Turn-signal lights shall be provided on the front, rear, curb and street sides of the bus in accordance with federal regulations.

Turn signal lenses on both the front and rear of the bus shall be amber. Rear turn signals are to be 4 inch diameter LED, two on each side of rear surface. Turn signals shall also be provided on both sides of the bus. Four turn signals are to be provided on each side. One set shall be located both front and back of the front wheels, and a second set shall be located both front and back of the wheels for the drive axle. The side turn signal lights shall be amber, guarded, LED's. Lamps used shall be 12 volt.

TS 72.4 Headlights

Headlamps shall be designed for ease of replacement.

Headlights shall meet all FMVSS and California State regulations and must be as small as possible while meeting all legal requirements and in keeping with the bus front end styling. Alternative lamp sizes may be considered if necessary to prevent the lamp beams from being obscured by a bicycle mounted in the bike rack.

Headlights shall be LED and shall include a direction-of-travel feature to increase illumination in the direction of turns. Additional light for direction-of-turn feature must be directed towards the turning direction by 25 to 40 degrees from the forward direction of travel and for a distance of 30-50 feet. It shall be activated automatically with the appropriate turn signal (but not included with flashers). In all other respects the headlights must illuminate the road surface ahead of the bus in a manner essentially typical to standard halogen headlights.

TS 72.5 Brake Lights

TS 72.5.1 Transit Coach

Brake lights shall be provided in accordance with federal regulations and shall be 4" diameter.

In addition to the standard stoplights, two additional rear center stoplights shall be mounted above the bus rear service door, at a location approved by VTA prior to production of the first bus.

TS 72.6 Service Area Lighting (Interior and Exterior)

LED lamps shall be provided in the rear service 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 rear service 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.

All service compartment lamps shall be controlled by a switch mounted near the rear start controls. 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 ninety (90) 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 73. General Requirements

Materials shall be selected on the basis of maintenance, durability, appearance, safety, 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 ten (10) inches below the lower edge of the side windows or windshield shall be shaped so that objects placed on them fall to the floor when the coach is parked on a level surface. Any components and other electrical components within close proximity to these surfaces shall also be resistant to this cleaning method.

All interior non-metallic trim shall be coated with anti-graffiti coating having at least equivalent resistance to inks and paints as Deft coating.

Panels and structural components must be free of any dust, metal shavings or debris prior to assembly or installation.

TS 74. 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.

Interior panel required to meet FMVSS 302.

Textured stainless steel for wall sections below the window line.

TS 74.1 Driver Area Barrier

TS 74.1.1 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 (1.2kg), microcomputer, public address amplifier, etc. The panel should be properly attached to minimize noise and rattles.

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.

The Operator's barrier shall wrap around the operator's area, forward of the transverse plane, a minimum of 4 inches.

The operator barrier shall be located such that there is no interference with the seat or the operator's shoulder harness housing with full seat travel and the seat in its most reclined position. A protective grab rail shall be incorporated over the operator's storage box area to prevent passenger access and to aid passengers standing in this area.

The upper section of the operator's barrier shall be 1/4 inch transparent polycarbonate material with a gray 2074 tint. This requirement will be waived if bus design includes a component compartment on the wheel housing behind the operator.

TS 74.2 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 its top edge. These dividers shall be mounted on the sidewall and shall project toward the aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend 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. clearanee 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 pinehed. 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 lbs. applied to a 4 × 4 in. area in the center of the panel without permanent visible deformation.

TS 74.3 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 74.4 Rear Bulkhead

The rear bulkhead and rear interior surfaces shall be textured aluminum or stainless steel, or smooth black melamine at least 1/8 inch thick.

The rear bulkhead paneling shall be contoured to fit the ceiling, side walls 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 74.5 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.

The headlining color shall be Pionite Carnation White SW-806, and the headlining shall have a high gloss finish to allow easier cleaning of graffiti.

TS 74.6 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 74.7 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 drive unit 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.

All insulation materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, dated October 20, 1993.

TS 74.8 Floor Covering

The floor covering shall have a non-skid 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 standee line shall be approximately 2 in. wide and shall extend across the bus aisle. The color and pattern shall be consistent throughout 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.

The floor covering shall be black vinyl material with embedded aggregate for slip resistance, a minimum 2.7 mm thick. A scrim layer to assure adhesion and dimensional stability shall be included in the material construction. For slip resistance the tested coefficient of fiction shall be a minimum of .6 wet or dry. Construction of the material shall assure that slip resistance shall not be reduced to less than .6 throughout the life of the bus. Floor covering shall be joined smoothly at the doorways, moldings and nosings. Embedded aggregate shall not create light refleetions in the windshield at night. All seams shall be smooth and water tight for the life of the bus. Standee line and the edges of all doorways and steps shall be yellow, no less than 2 inches or more than 5 inches wide on the full width of the edge. Width of each band shall not vary more than +or- 0.25 inches. Material to have durability similar to Altro Transflor.

The flooring shall be primarily black. The wheel chair area shall have one each ADA logos included in the flooring. The logos shall be blue on a white background. The logos shall be made of the same flooring material as used throughout the coach and shall be as durable and water tight as the rest of the flooring. The standee line and door way shall be yellow.

TS 74.9 Interior Lighting

Thc 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 diffusion optics of the lenses shall be designed in conjunction with the size and spacing of the LEDs to thoroughly 'mask' the individual LEDs. Lenses shall not drip flaming material onto seats or interior trim if burned. 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 threaded fasteners are used, they must be held captive in the lens. If necessary, the entire light fixture shall be hinged.

TS 74.10 Passenger

All interior lighting shall be turned off whenever the transmission selector is in reverse and the system run switch is in the "on" position.

The interior lighting design shall require the approval of VTA.

Lights shall be LED

An overhead LED lighting system, 12 or 24 volt, shall provide general illumination in the passenger compartment and shall be controlled by a switch located on the operator's console and through the run switch 'RUN', 'NITE RUN' and 'CL/ID' positions only. A separate service switch, located on the dash 1 inch inboard of the run number box, shall be incorporated to activate lighting during bus cleaning with the master run switch and the operator's switch in the "OFF" position. The operator's switch shall be labeled with three positions, "OFF," "NORMAL" (which will cause the lights to be controlled by the run switch); and "UNLOADED" (which will turn on only the LED lights located at of the lead edge of the exit door). The lighting system shall be designed so that changing which lights are to be activated by the door (see below) and by the Operator's switch can be easily accomplished.

The light source shall be located to minimize windshield glare with distribution of the light focused primarily on the passenger's reading plane while casting sufficient light onto the advertising display. LED light strips shall be standard, readily available, lengths, and shall be a maximum 6 foot long.

Advertising media located in this area shall be illuminated by direct lighting, although the interior lighting requirements shall be attained without advertising media installed. The lenses shall be retained in a closed position but not require tools to open.

When in the RUN and NITE/RUN modes, the front two LED light fixtures on each side of the bus shall extinguish when the front door is in the closed position and shall light when the door is in the open position.

The light system shall be designed to interlock, while requiring no additional fasteners, with air conditioning ducting of identical material to provide an air duct exceeding 120 square inches in cross section.

Interchangeability of all LED lamps, lenses, fixtures and power supplies shall be maximized. Except for the step area, ramp, fare box and Operator's reading lights, no lighting shall be installed forward of the standee line.

TS 74.11 Driver's Area

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 foot-candles.

TS 74.12 Seating Areas (Transit Coach)

The interior lighting system shall provide a minimum 15 foot-candle illumination on a 1 sq. ft. plane at an angle of 45 degrees 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 foot-candles.

TS 74.13 Vestibules/Doors (Transit Coach)

Floor surface in the aisles shall be a minimum of 10 foot-candles, and the vestibule area a minimum of 4 foot-candles with the front doors open and a minimum of 2 foot-candles with the front doors closed. The front entrance area and curb lights shall illuminate when the front door is open and master run switch is in the "lights" positions. Rear exit area and curb lights shall illuminate when the rear door is unlocked.

TS 74.14 Step Lighting

An LED lighting system for any steps to the rear seating section shall be illuminated when the master switch is in the "RUN," "NITE/RUN," or "CL/ID" position. The system shall provide no less than two (2) foot-candles of illumination on the rear step treads. These lights shall be shielded to protect passenger's eyes from glare. Light fixtures shall be totally enclosed, splash proof, and designed to provide ease of cleaning. Lamps shall be easily replaceable from inside the bus. The light assembly shall not be easily removable by passengers. Step lights shall be protected from damage caused by passengers kicking lenses and fixtures and shall not be a tripping or snagging hazard to passengers. Preference will be given to theater style strip lights along the step edges.

TS 74.15 Ramp Lighting (Transit Coach)

Exterior and interior ramp lighting shall comply with federal regulations. Whenever the ramp is deployed, all turn signal lights shall flash.

TS 74.16 Turntable Lighting (Articulated Coach)

Section not used.

TS 74.17 Fare box Lighting

TS 74.17.1 Transit Coach

An additional light shall be positioned to provide illumination to the fare box while minimizing glare in the windshield. It shall be controlled by a switch that is convenient to the operator and that can be activated with the master run switch in the NITE/RUN position. The light shall provide a minimum of 1 foot-candles of illumination at the floor around the fare box and 3 foot-candles at the top of the fare box.

TS 75. 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 fare box controls and to view the fare register. The fare box shall not restrict access to the driver 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 Recommended Practice J1050. The location and mounting of the fare collection device shall allow use, without restriction, by passengers. The fare box location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on

the fare box shall be readable on a daily basis. The floor under the fare box shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the fare box.

Contractor shall provide fare collection installation layout to VTA for approval with their proposal.

Transfer mounting and cutting equipment shall be located in a position convenient to the driver. The position shall be determined during the pre-production meetings with the successful proposer.

TS 76. 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 over-center 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 shall be secured with locks. The locks shall be standardized so that only one tool is required to open access doors on the bus.

The destination sign door and other vestibule area access doors shall be hinged and fastened with hand screws or latches, and not require tools to open.

Overall design will be subject to VTA approval.

TS 76.1 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 VTA 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.

Access to the top of the electric drive, ESS, and drive controllers shall be provided. The middle three seats of the settee shall swing up when unfastened and be secured in such a way as to allow a 95th percentile male access to the electric drive, ESS, and drive controllers. The settee access system shall be fully sealed when in normal bus operating position so as not to compromise the firewall function in any way. Overall design will be subject to VTA approval.

Access to the high voltage system cabling, plumbing and level sender must be assured. If necessary to assure access, a plate in the bus floor shall be provided.

PASSENGER ACCOMMODATIONS

TS 77. Passenger Seating

TS 77.1 Arrangements and Seat Style (Transit Coach)

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).

The passenger seating arrangement in the bus shall be such that seating capacity is maximized and in compliance to the following requirements.

Seats shall be American Seating Corporation InSight model or approved equal allowing at least equal hip-to-knee room, ease of servicing, durability and comfort. Seat pan length shall be a minimum of 17 inches and the width of a transverse pair shall be a minimum of 36 inches. Seating surface shall have one inch foam padding with covers as defined. Under seat closeouts are to be omitted. Coloring of the frame and shell shall be consistent throughout the seating material, with no visually exposed portion painted. All visually exposed metal of the standard seat structure including mounting brackets and other components shall be aluminum or stainless steel.

The seat shall be contoured for maximum comfort and shall fit the framework to reduce exposed edges. The seat forward of a seated passenger shall absorb energy in a severe crash by allowing the passenger's knees to deform the seat back in accordance within RPF requirements. Complete seat assemblies shall be interchangeable to the extent practicable.

Seating and interior trim shall have features to improve safety, comfort, and capacity. Upholstery shall be Morbern 'Wave' material, style and color to be WV-205 Freestyle Blue.

The upper rear portion of the seat back, seat back handhold, and upper rear surface of the modesty panels located immediately forward of transverse seats shall be padded and/or constructed of energy absorbing materials. Seats, back cushions, and other pads shall be securely attached and shall be detachable by means of a simple release mechanism employing a special tool so that they are easily removable by the maintenance staff but not by the passengers. To the extent practicable, seat cushions and pads shall be interchangeable throughout the bus. All materials and workmanship shall conform to SPI standards and specifications in tests for plastic foam. Materials shall have high resistance to tearing, flexing, and wetting.

All fiberglass and/or plastic (polycarbonate, ABS, etc.) materials subject to graffiti shall be coated with Special-T anti-graffiti coating or approved equal having similar clean ability and durability.

Preference will be given to Proposal that offer the most seats.

In addition to those in the wheelchair area, four seats shall be flip seats than can be folded up individually to allow storage of items such as strollers or small shopping carts next to either seated position. The individual flip up seats shall be the second row of transverse seats from the front of the coach.

TS 77.2 Rearward Facing Seats (Transit Coach)

Rearward facing seats not allowed

TS 77.3 Turntable Seating (Articulated Coach)

Section not used

TS 77.4 Padded Inserts/Cushioned Seats (Transit Coach)

The passenger seats shall be equipped with padded inserts throughout the bus 1 inch thick (measure to uncompressed surface).

TS 77.5 Seat back fitness

Seating and interior trim shall have features to improve passenger comfort. The seat cushion and back shall be padded with a cellular foam product and be no less than ½ in. thick in areas contacted and loaded by passengers in the normal seated position and shall be covered with vinyl and/or fabric material.

Seats, back cushions and other pads shall be securely attached and shall be detachable by means of a simple release mechanism so that they are easily removable by the maintenance staff but not by passengers. To the extent practicable, seat cushions and pads shall be interchangeable throughout the bus. Materials shall have high resistance to tearing, flexing and wetting.

TS 77.6 Drain Hole in Seats

No requirements for drain hole provisions in seat inserts.

TS 77.7 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 77.8 Foot Room

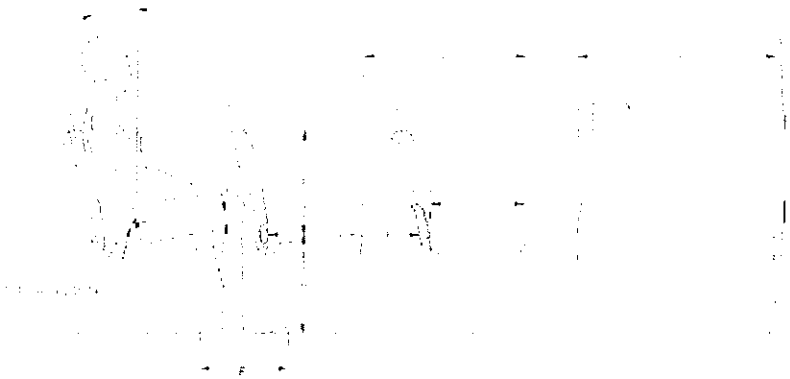
Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 in. Seats immediately behind the wheel housings and modesty panels may have foot room reduced.

TS 77.9 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 77.10 Dimensions (Transit Coach)

FIGURE 7
Seating Dimensions and Standard Configuration



Seat dimensions for the various seating arrangements shall have the dimensions as follows (refer to Figure 7):

- 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 under-floor 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 expressed approval of VTA.
- Foot room = F.
- The seat cushion slope, S, shall be between 5 and 11 degrees.
- The seat back slope, C, shall be between 8 and 17 degrees.
- Hip to knee room = K.
- The pitch, P, is shown as reference only.

TS 77.11 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 1,000 lbs. 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 to0.015 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 lbs. applied to the top of the seat cushion in each seating position with less than ¼in. permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 lbs. 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 the 10g deceleration the HIC number shall not exceed 400 for passengers ranging in size from a six year old child through a 95th percentile male.

The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where 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 lbs. 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 lbs. with less than ¼in. permanent deformation and without visible deterioration.

TS 77.12 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 78. 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 95th-percentile male and the 5th-percentile female standee. Starting from the entrance door and moving anywhere in the bus and out the exit door, a vertical assist shall be provided either as the vertical portion of 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 the other without losing support.

TS 78.1 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 powder-coated metal. Except where specified , all others shall be natural finish aluminum or stainless steel. Connecting tees and angles may be powder-coated metal castings. Assists shall withstand a force of 300 lbs. applied over a 12in. 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 78.2 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 and the vertical assist and the assists on the wheel

housing or on the front modesty panel. Assists shall be black powder-coated with yellow reflective tape strips to be applied at VTA approved locations.

TS 78.3 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.

All vestibule assists shall be black powder-coated with yellow reflective tape strips to be applied at VTA approved locations.

TS 78.4 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. The assists shall be yellow powder-coated.

TS 78.5 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.

Grip straps shall be Fabric. Grip straps shall be of a dual color design, black on the inner side and yellow on the outer side.

Overhead assists shall simultaneously support 150 lbs. on any 12 in. length. No more than 5 percent of the full grip feature shall be lost due to assist supports.

TS 78.6 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.

Every modesty barrier forward of a transverse seat shall have a horizontal assist, no less than 3/4 inch in diameter.

TS 78.7 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 78.8 Step Assists

Vertical assists shall be provided at each side of each step at the step area described in Section TS 29.4. Already provided assists at seats can be used to meet this requirement, with VTA approval.

TS 79. Passenger Doors

TS 79.1 Transit Coach

Doorways will be provided in the locations and styles as follows. Passenger doors and doorways shall comply with ADA requirements.

TS 79.1.1 Front Door

Door shall be forward of the front wheels, under direct observation of the driver, and located so that the operation is able to collect or monitor fare collection.

TS 79.1.2 Rear Door

Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.

If air-powered, the door system shall operate per specification at air pressures between 90 and 130 psi.

TS 79.2 Materials and Construction

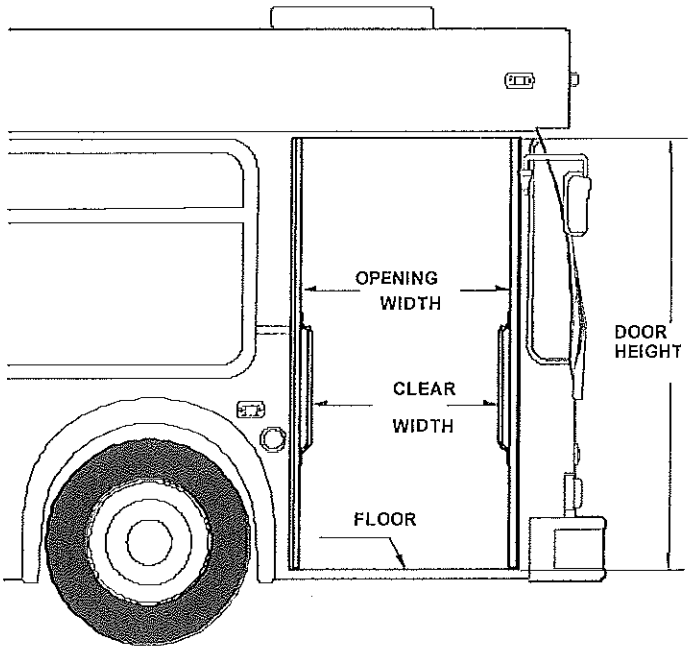
Structure of the doors, their attachments, inside and outside trim panels and any mechanism exposed to the elements shall be corrosion resistant. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. When fully opened, the doors shall provide a 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 degrees of binocular obstruction of the driver's view through the closed door.

TS 79.3 Dimensions

TS 79.3.1 Transit Coach

FIGURE 8
Transit Bus Minimum Door Opening



When open, the doors shall leave an opening no less than 75 in. in height.

Front door clear width shall be a minimum of 32 in. with the doors fully opened. Rear door opening clear width between the handles shall be a minimum of 40 in. with the doors fully opened. For the rear door if an outward opening (swing) door is specified, then the maximum outboard excursion of 13 in. may be exceeded.

TS 79.4 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 lower sections of the rear doors "exit doors" shall have no glazing.

Zip type glazing rubber.

The door panel glazing material shall have a nominal ¼ in. thick laminated safety glass conforming with the requirements of ANSI Z26.1 Test Grouping 2 and the recommended practices defined in SAE J673.

TS 79.5 Door Projection (Transit Coach)

TS 79.5.1 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 curb side 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 79.5.2 Interior

Projection inside the bus shall not cause an obstruction of the rear door mirror or cause a hazard for standees.

TS 79.6 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 79.7 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 lbs. 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 lbs.

TS 79.7.1 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.

The door system shall be equipped to signal the operator if the doors close on any part of a person's body or any object. The signal shall be audible to the operator and shall sound whenever the obstruction sensing system impacts an object sufficiently to reverse door direction. It shall also activate with the door closed when an object imparting 10 pounds of force is caught between the center edges of the closed door.

TS 79.8 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 rebuild-able. 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.

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 lbs. 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.

All passenger doors shall be fully electrically controlled and actuated. No pneumatic systems are to be used.

TS 79.8.1 Rear Door Interlocks (Transit Coach)

See TS 37.1, "Passenger door interlocks" for door system interlock requirements.

TS 79.9 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 lbs. 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.

Unlocking device shall function in accordance with TS 37.1 – Passenger Door Interlocks.

TS 79.10 Door Control

The door control shall be located in the operator's area within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach." The driver's door control shall provide tactile feedback to indicate commanded door position and resist inadvertent door actuation.

The front door shall remain in commanded state position even if power is removed or lost.

TS 79.11 Door Controller

TS 79.11.1 Transit Coach

The control device shall be protected from moisture. The door control shall be a five position single lever switch with removable handle and function as a 5/16 inch key lock. The lever shall be located on the street side of the operator's area, forward of the seat, and approximately 23 inches above the floor in the operator's seat area. Exact location requires approval of VTA. 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 79.12 Door Open/Close

Operation of, and power to, the passenger doors shall be completely controlled by the operator.

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 80. 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.

The design and construction of the bus shall be in accordance with all requirements defined in 49 CFR, Part 38, Subpart B: ADA Accessibility Specifications for Transportation Vehicles - Buses, Vans and Systems, the latest approved ADAG Board guidelines and California Title 13 standards. Space and body structural provisions shall be provided at the front door of the bus to accommodate a wheelchair ramp which meets these requirements.

TS 80.1 Loading System for 30 to 60 ft. Low-Floor Bus (Ramp)

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.

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 4:1 slope with the bus kneeled, and no slope inside the bus entryway shall be permitted without approval of VTA. The normal door width, door operations or other specified dimensions shall not be compromised. When the system is not in use the

doorway shall appear normal, and no portion of the doorway shall move when the doors open. The controls shall be simple to operate with no complex phasing operations required and the loading operations shall be under the surveillance and complete control of the operator. The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The interlock system shall also function when the ramp is deployed manually.

The incorporation of the wheelchair loading system shall not present a hazard, nor inconvenience any passenger. The wheelchair loading platform area and aisle shall be no less than 30 inches wide and capable of accommodating a total load of 800 pounds. Preference will be given for wider ramps. The device shall be prevented from folding when a passenger is on the ramp. A passenger on the ramp shall be able to easily obtain support during the entire loading or unloading operation by grasping the passenger assist located on the doors or other assists provided for this purpose. The ramp shall extend no less than 18 inches outward of the bus with the transition from the sidewalk to the loading device not exceeding 1/2 inch. The angle of the ramp when deployed to ground level with bus kneeled shall not exceed 14.5 degrees (1:4 height to length ratio). The ramp shall be designed to protect the device from damage and persons on the side-walk from injury during deploying. The ramp and passageway 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.

When deployed, the transition from the ramp to the floor shall be smooth. Deployment or storage of the ramp shall require no more than 5 seconds. The device shall function without failure or adjustment for 1500 cycles or 90,000 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 ramp in the event of a primary power failure. The ramp shall meet VTA approval prior to production of the first bus.

Protruding parts on edges of the ramp mechanism shall be avoided. Any ramp or bus parts which could be involved in an impact with the wheelchair passenger shall be padded or with radius.

With the ramp in the stowed position there shall not be any gaps or openings where dirt of debris may collect or where entering or exiting passengers may be injured.

The underfloor components of the ramp mechanism shall be completely enclosed to prevent damage from external elements. The enclosure must be secured during operations but easily opened for servicing components.

The ramp shall be capable of lowering 1.5 inches below the reference ground line. The ramp may be hydraulically operated and/or electrieally controlled. If hydraulic are used, the system shall be equipped with a fluid filter which shall be readily accessible without removing panels and easily replaced without system de-aeration problems. The filter shall be industry standard. The system shall be equipped with a pressure relief valve to prevent hydraulic pressure build up and ramp or vehicle damage. Hydraulic lines and eomponents in the system shall be designed to withstand 2X the maximum normal operating pressure. The operating components shall not emit any objectionable noise. Interior noise levels shall be in compliance with local, state, and federal noise requirements. The electrical control system shall be a 12 volt system; control solenoid valves shall be capable of operating continuously without overheating or failures.

The ramp assembly shall incorporate a manual method of deploying and stowing an empty ramp if power to the ramp fails. Instructions to guide the operator in a step-by-step manual operating procedure shall be located so as to be readily readable by the operator.

Simple, durable instructions to guide the operator in proper ramp operation shall be located so as to be readily readable by the operator when using the ramp controls

The ramp shall comply with specifications shown in the following sections of California Code, Title 13, Chapter 4, Article 15. VTA recognizes these requirements were written to cover Lifts, but the specifications noted below are also applicable to sound ramp design practices:

1092, paragraph (a) Design Load
1092, paragraph (d) Power or Equipment failure
1092, paragraph (g) Platform surface
1092, paragraph (h) Platform deflection
1092, paragraph (k) Protective covering
1092, paragraph (l) Fasteners
1093, Durability, paragraphs (b), (c), (d), (f) and (g)
1094, Certification
1095, Installation

TS 80.2 Wheelchair Accommodations

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.

Each wheelchair position is to be equipped with a detection sensor that is tied into the bus multiplexing system. This data should be available in real time via the multiplexing system.

Folding seats shall be used in the wheelchair restraint location such that when the restraint is not in use, standard seating shall be available. A minimum of 72" in clear width is required with the seats folded in order to provide space for two side by side wheelchairs and the aisle. Folding seats must conform in style and appearance to the seating throughout. No more than ten total seat spaces shall be lost when wheelchairs are loaded in both restraint positions. Preference will be given for arrangements that result in the loss of fewer seats.

Flooring in the wheel chair area to be black as specified in the floor section of this RFP.

TS 80.3 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 degree turns of wheelchairs should have a clearance arc dimension no less than 45 in., and in the parking area where 180 degree 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 80.4 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. Securement areas shall be a minimum 30 × 48 in. as required by the ADA.

Wheelchair restraints shall meet all ADA requirements in effect at the time of bus manufacture. Two different restraint systems shall be used. On the streetside of the bus the restraint system shall be the Q'Straint Q'pod, with integral modesty panel, restraints, retraction control paddle handle, and passenger lap/shoulder seatbelt system or approved equal showing equal or better functionality and performance. On the curbside of the bus the restraint system shall be the Q'Straint Qauntum automated wheel chair restraint with integral modesty panel, restraints, and passenger lap/shoulder seatbelt system or approved equal showing equal or better functionality and performance. The curbside automated wheelchair restraint system shall be forward facing. The proposer shall insure that the Curbside bus structure, flooring, and seating in the wheelchair restraint area can easily be retro-fitted to a Q'Straint Q'Pod, or approved equal provided. The proposer shall also include 5 complete wheelchair restraint systems matching the system provided on the street side, but design for the curbside of the bus, including all seats and modesty panels. Floor pockets are not to be used. Any approved equal must have equivalent or superior ease of use for the Operator, comfort for the passenger, and impact on dwell time.

The full ADA wheelchair space in accordance with latest approved ADAG Board guidelines shall be available with the restraints in use. Replacement of the restraint components shall not require the removal or disassembly of any other part of the bus. Wheelchair attachment hooks are to be yellow as available from Q'Straint.

All belt and retractors are to be made available as replacement parts independent of the full restraint system arms or housings.

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.

SIGNAGE AND COMMUNICATION

TS 81. Destination Signs

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.

1) All signs shall be synchronized to run through whichever of the two control consoles is activated (see below), and shall be independently enclosed and sealed to prevent entry of dirt and debris. The rear and street side route number signs shall be programmed to display characters which are not necessarily the same as the first four characters of the front and side destination signs. Nonetheless, all signs shall be set by one code set on the control console.

2) The characters together are to be capable of displaying a constant-on single line message and capable of flashing a multi-line message with a complete blackout to mark the end of each line of the message. The time of display of each line of a multi-line message is to be adjustable within limits to be agreed upon by VTA and the manufacturer. Control of the message shall be by means of a three digit (four-digit if necessary to match the memory capacity) code number corresponding to each one or multi-line message in the memory bank. The destination sign system shall be designed to interface with the Advanced Communications System provided by Xerox. The interface system shall be such that as the operator keys in the route/block information on the Xerox controller, the destination sign will automatically display the appropriate information for the route and for the specific bus run number (on Front Run Sign). The manufacturer shall provide a plug for the destination sign system which will allow the interface of the sign system with the Xerox system. A separate control console shall be provided which can be used to directly program the destination sign display, with a switch for bypassing the combined Xerox–destination sign programming system.

3) A monitoring device, in the form of a display, is to be mounted in such a way that it will permit the bus operator to verify the entire message being displayed toward the front and side of the bus without having to leave his/her position at or near the operator's seat.

4) The sign setting procedure will be as follows: The bus operator sets up a code number, pre-assigned and corresponding to their destination, on the switch controlling the destination sign. The operator then operates an activating switch which will cancel any display currently on view and will cause to be displayed the destination reading that the operator just selected. The monitoring device will then repeat either continuously (or continually and simultaneously line by line for multi-line exposures) the message displayed toward the outside of the bus on the sign proper. When the operator shuts the power run switch to the "off" position, the front, side and rear destination signs shall go to an all-black condition within ten seconds to minimize ultra-violet fade in the display boards.

5) The sign programming shall be via a J1708 maintenance/programming port located on the Xerox radio system through the radio TIB which is installed in the Radio Equipment Enclosure. Preference will be given to systems that can show other connectivity such as J1939, Ethernet, or Wi-Fi. It is also expected that the system will successfully interface with VTA's replacement CAD/AVL from Clever Devices.

6) The Destination Sign Control Console ("Console") shall be located so that all buttons and/or switches are accessible by a Fifth Percentile female either sitting in the operator's seat or standing in the vestibule. The Console must be located so that boarding passengers cannot easily tamper with the settings.

7) Preference will be given to systems that can accept programming from various connections, J1939, WLAN, etc.

8) Preference will be given to systems that can show other connectivity such as J1939, Ethernet, or Wi-Fi.

9) The Destination sign Control Console shall have dedicated back lite push buttons for every number 0 through 9 and all letters "A" through "E".

10) The Destination sign message database shall be updated on board the bus by both USB downloading and remotely by WLAN or Wi-Fi.

The entire display area of all signs must be readable in direct sunlight, at night, and in all lighting conditions between those two lighting extremes, with evenly distributed illumination appearance to the un-aided eye. Independent Controller Boards shall be mounted on the front and side destination sign. The system shall be capable of communicating with and controlling additional information devices, such as interior information signs, Voice Annunciation devices, fare box, etc. The system shall provide for destination and/or Public Relations (P/R) message entry. Flash memory integrated circuits shall be capable of storing and displaying at a minimum 10,000 message lines. The System shall have the ability to sequentially display multi-line destination messages, with the route number portion remaining in a constant "on" mode at all times, if so programmed. It shall also be capable of accepting manual entry of Route Alpha/Numeric information on any/all signs. An emergency message shall be activated by a push button or floor switch in a location to be approved by the procuring agency. The emergency message shall be displayed on signs facing outside the vehicle while signs inside the vehicle, including the OCU display, remain unchanged. The emergency message shall be canceled by hitting the activation button a second time (See also TS 82.4.4).

The LEDs shall be mounted such that they are visible directly to an observer positioned in the viewing cone, allowing for full readability 65 degrees either side of the destination sign centerline. The LEDs shall be the only means of illumination of the sign system. The LED illumination source shall have an operating life M.T.B.F. of not less than 100,000 hours.

TS 81.1 Exterior Signs

All exterior sign shall be LED displays. Exterior signs shall be Dinex Diamond Dot with amber LED displays, or Approved Equal having equivalent or superior visibility, operation, durability and ease of programing, ease of maintenance and ease of diagnostics.

Front Sign:
Shall at a minimum be 16 rows x 156 columns; display height minimum 7.9 inches, display width 63." It shall be installed above the windshield, enclosed in a suitable compartment, with mechanism and equipment arranged so as to permit cleaning of the front sign glass without the use of tools At a minimum, the sign shall be supported by a hinged mount to allow it to be turned up, or otherwise attached in such a manner as to permit cleaning of the glass. The compartment shall be sealed to prevent entry of dust, dirt, water, and insects during normal operation.

The bus sign glass shall be AS-3, ANSI-2.61, clear, 1/4 inch thick, laminated or solid tempered safety sheet glass, clear glazing material. The bus destination glass shall include a Westco UV protection system or approved equal.

Street side Side Sign:
Shall at a minimum be 14 rows x 72 columns; display height minimum 4.00 inches, display width 28". Like the front sign, the sign shall be supported by a hinged mount to allow it to be turned up, or otherwise attached in such a manner as to permit cleaning of the glass. It shall be located in the first passenger window after the Operator's window.

Curbside Side Signs:
Shall at a minimum be 14 rows x 108 columns; display height minimum 4.00 inches, display width 42", to be mounted in the first passenger window behind the front door.

Rear Sign:
Shall at a minimum be 16 rows x 48 columns; display height minimum 5.0 inches, display width 15".

Front Run Sign:
Shall at a minimum be 16 rows x 36 columns; display height minimum 5.0 inches, display width 15".

TS 81.2 Interior Signs

An interior next stop sign display signs shall be supplied, compatible with the Xerox radio system. The sign shall be located so as to be visible to the seated operator and seated passengers in the front section of the bus. The sign shall be capable of displaying the next stop request sign function in addition to displaying the scrolled next stop announcement.

The interior next stop announcement displays shall:

- Be a single line 16 character, 27"x 2.125"x 4.125";
- Red LED display with clear 20/20 visibility at a minimum of ninety (90) feet and with a +/- 75 degree view angle;
- Power requirements for the display shall not exceed 30W and shall be capable of operating on a voltage between +10Vdc and +30Vdc;
- The display shall be addressable through the VTA Xerox radio system and have a SAE J1708/1587 compliant RS-485 serial communication interface;

The system shall:

- Be capable of operating under temperatures between 0 and 40 degree Celsius, and at relative humidity between 10 and 90 %;
- Withstand temperatures between –40 and +70 degree Celsius without damage or deterioration;
- Have power supplied by the same source as the radio equipment over a minimum of 18 AWG two-conductor fused power cable with a twisted shielded cable pair for connecting the J1708 control signals;
- Have the power cable and signal lines share a single split loom jacket. The connections are made with ring terminal lugs. There shall be four connections: two (2) signal connections and two (2) power connections.

VTA shall supply the signal line to the bus Contractor for installation in the factory. The signs and the power lines shall be supplied by the Contractor.

Location of the destination sign components should not prevent access to the Xerox radio system equipment or to any other vehicle components for repairs and/or R&R.

TS 82. Passenger Information and Advertising (Transit Coach)

TS 82.1 Interior Displays

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 82.2 Exterior Displays

Provisions shall be made to integrate advertising into the exterior design of the bus. Advertising media, frames or supporting structures shall not detract from the readability of destination signs and signal lights, and shall not compromise passenger visibility. Advertising provisions shall not cause pedestrian hazards or foul automatic bus washing equipment, and shall not cover or interfere with doors, air passages, vehicle fittings or in any other manner restrict the operation or serviceability of the bus.

VTA has a contract with an agency to provide stick on type advertising. Provisions shall be made to integrate advertising into the exterior design of the bus. Advertising space shall include the following:

Curb side --- 30" x 88"
Street side ---30" x 144"
Rear---------- 21" x 72"
Front---------Proposer to note available space for advertising

Contractor shall provide a set of drawings detailing the available advertising space, prior to production of the first bus.

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.

A labeled, low profile push button exit signal, no less than 5 inches long and 2 inches wide mounted horizontally when the wheelchair seat is in the folded up position, shall be located on the midpoint of the underside of each flip-up seat for use by wheelchair passengers.

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 Signal Chime

TS 83.2.1 Transit Coach

Two passenger signal chimes, Faraday Model 1531, shall be provided or approved equal showing similar performance and durability. One chime, audible to the Operator, is to be located in the front half of the bus. The second shall be positioned such that it is audible throughout the passenger area. All chimes shall be activated simultaneously by pull cords.

A single "Stop Requested" chime sound shall occur when the system is activated. A double chime sound shall occur when the system is activated from Wheelchair passenger areas. An operator-controlled switch shall deactivate the chime system.

The chime will sound when the lights are first illuminated but will be deactivated thereafter while the message lights are on. The lettering on the rearmost sign shall be invisible when the signs are not illuminated.

A green light on the dash will be illuminated with the words "STOP REQUESTED" printed in white letters. The location and the design of the sign shall require the approval of VTA.

When a stop is requested from a wheelchair area, a blue light on the dash will be illuminated with the words "W/C STOP REQUESTED" printed in white letters

TS 84. Communications

VTA expects that all electronics cabinets and areas around electronics modules of any type on the bus provide easy access to all ports and harness connections. As such VTA expects that in order to provide this access the contractor's design will require sliding drawers in some locations. All sliding drawers used shall have latch mechanism internal to the slide similar to the pin and bayonet design found in Accuride 9307/9308/9327 drawer slides.

TS 84.1 Camera Surveillance System

Mobile Network Video Recorder

Each bus is to be equipped with a complete fully functional CCTV system. The system will consist of but not limited to a mobile Network Video Recorder (NVR), removable solid-state hard drive caddy (SSD), wiring, cameras, motion detector, microphones, wireless AP/bridge/client, GPS, mobile cellular router and antennas. NVR shall provide a continuous video record of activity inside, in front of and both sides of the bus. Have the capability of interfacing with Wi-Fi, GPS, radio systems, cellular systems and other wireless transmission media for transmitting images to VTA security and maintenance staff. The system shall be a ruggedized, networked device purpose built for the capture and processing of mobile digital video. NVR shall not be based on generic industry PC components. It shall comply with all applicable Federal, State and Local regulations. Contractor shall supply, install, configure and commission the NVR and shall have the following minimum features.

A. System shall be compatible with all standard 802.11 b/g/n wireless devices.
B. Support a minimum of 12 IP cameras.
C. Have a lockable, removable solid-state hard drive (SSD) caddy with a minimum storage size of 1TB.
D. The system shall be capable of recording video from CIF up to 1080P and support H.264 compression.
E. Have the ability to program frame rate and resolution individually on each camera.
F. Provide a means of self-diagnostics / health check, to include cameras, drives, GPS and other failures.
G. The NVR upon connection to VTAs wireless network will automatically download all health / alarm information and any scheduled video.
H. Clock shall automatically synchronize via the 802.11b/g/n or GPS and update at each connection as needed.
I. A battery back-up will be provided to protect system operation against power fluctuations and provide a backup for a normal shutdown in case of power loss.

J. Shall start up and record both video and audio automatically without any human intervention when ignition is turned on or motion is detected on the bus.
K. Shall not interfere with the operation of the vehicle and shall not cause EMI, RFI or other electronic interference with existing systems on the vehicle such as the radio or electronic controls. Maximum system power requirements shall be 10 ampere continuous.
L. Have a minimum of 7 hardwired sensor inputs.
M. Provide environmental protection to ensure safe and reliable operation of the NVR and solid-state hard-drive. Shall operate in temperatures ranging from 32-155 degrees F (0-70C).
N. The MDVR shall operate on vehicle power between 6-36 VDC.

Microphone

A. Microphones may be integrated into the interior cameras or use two standalone flush mount units. Standalone microphones shall be mounted, one in the front near the operator and one in the mid area of each bus.
B. Integrated camera microphones shall be configurable to activate or deactivate.
C. The standalone microphones shall have a flush mount vandal resistant cover and screws.
D. All microphones shall clearly hear a conversation within ten feet with air conditioner running.

Battery Backup-Power Conditioner

A. An external or internal UPS / power conditioner is required, that component shall be a ruggedized purpose built unit designed to withstand mobile applications. Shall provide backup power for NVR to safely shut down in the event of power loss.

Motion Detector

A. The motion detector shall be a flush mounted, vandal resistant type with vandal resistant screws.
B. It shall have an internal sensor that cannot be moved or adjusted by unauthorized personnel.
C. Shall be connected in such a way to allow the NVR to start and record video and audio when ignition switch is off and motion is detected in the interior of the bus.

Cable Connectors Hardware

- All Ethernet cables shall have factory installed connectors on both ends. No field installed RJ45 connectors will be accepted.
- All coax cables shall be RG-59U with a solid or stranded copper center conductor and a 95% bare copper shield specifically designed for CCTV applications.
- BNC connectors shall be a 3 piece crimp on type.
- All components of the system, NVR, cameras, motion detector, timer and microphones shall have connectors (RJ45, BNC, Molex etc.) on both ends of cable for maintenance purposes.
- All conductors other than coax must be stranded, solid conductors will not be allowed.
- All cables shall be continuous without splices or connectors other than the approved connector at each end. No butt splices or wire nuts are permitted for any connections.
- Analog camera power cables shall be a minimum of 18/2 stranded copper.
- All components shall have a minimum one foot service loop on both ends of all cable.

- Cables shall be permanently marked at each end with number and device name.
- All panel penetrations and sharp edges where cable is installed shall have rubber grommets or shielding installed to protect cable.
- All cables entering the communications cabinet shall be installed in such a way to allow a coil of slack to prevent pressure pulling on connectors and allow re-termination of failed connectors.
- No wiring may be exposed the passenger area of the bus or be installed in such a way that it could be vandalized.
- No system components or tie wraps may be mounted secured or attached in any way with double back sticky tape, glue silicone or similar products.

Cameras

A. All cameras shall be manufactured specifically to operate in a mobile environment.
B. Capable of withstanding vibration, shock and temperature ranges from -10 C to 50 C.
C. Interior IP Cameras
    1. Have the Wide Dynamic Range (WDR) feature to allow them to respond quickly to changes in light levels.
    2. Lens options in the 2.8 mm range for interior cameras and 6.0 mm for forward facing camera.
    3. Support CIF through 720P resolutions.
    4. IP67 rated against dust and water.
    5. Shall be Power over Ethernet.
D Exterior IP Cameras
    1. Have integrated IR illuminator.
    2. Lens options in the 3.6 mm range.
    3. IP67 rated against dust and water.
    4. Shall have both Ethernet and analog connections.
    5. Support CIF through 720P resolutions.
    6. Shall be Power over Ethernet.
E. Analog Exterior Cameras
    1. Have a day/night feature and be equipped with IR.
    2. Automatically adjust and compensate to sudden lighting changes.
    3. 420 minimum lines of resolution.
    4. Waterproof.
    5. Cover to protect top of polycarbonate lens cover.
F. Housings shall be available in both black and white to match mounting locations inside the bus.
G. All camera covers shall be installed with vandal screws.
H. All ceiling mounted cameras shall have all holes and cable entries sealed to prevent dirt and debris from falling into camera dome.

Camera Layout

Cam 1 Forward facing IP camera facing through the windshield viewing street directly in front of the bus 6.0 mm lens.
Cam 2 Front of bus viewing front door. 3.6 mm.
Cam 3 Front of the bus viewing the operator. 2.8 mm.
Cam 4 Front of bus viewing mobility impaired seating area. 3.6 mm.
Cam 5 Rear of bus viewing rear door. 3.6 mm.

Cam 6 Rear of bus viewing rear seating area. 3.6 mm.
Cam 7 Curb side outside viewing rear door exterior area 3.6 mm
Cam 8 Street side outside camera view 3.6 mm.

Actual location of all cameras to be determined at pre-production meetings

Basic Equipment List

Safety Vision 7000S NVR	1 ea.
Safety Vision Cable Kit	1 ea.
Axis P3904-R Camera	8 ea.
Safety Vision Exterior Gen 3 Camera	3 ea.
Safety Vision Camera Harness Cat5	8 ea.
Safety Vision Camera Harness Coax	3 ea.
Axis P8221 I/O Module	2 ea.
Axis T8351Mic	2 ea.
Safety Vision 2.4 Wi-Fi antenna	1 ea.
Garmin GPS Kit	1 ea.
MOXA AWK-3131 AP/Client/Bridge	1 ea.
Safety Vision Motion Detector	1 ea.

TS 84.2 Public Address System

A public address system shall be provided on each bus for facilitating radio system and driver-originated announcements to passengers.

A public address ("PA") system shall be provided that complies with the ADA requirements of 49 CFR, Part 38.35 and enables the operator to address passengers both inside and outside the bus.

The PA system must be arranged so that it cannot override the annunciator system. Switching the PA from inside to outside speakers shall not require volume adjustment. The system shall be muted when not in use. The microphone shall be a hand held style with an On-Off switch on the hand held unit. The switch shall be spring loaded to be in the Off position whenever the operator is not pushing on it. The plug-in connection for the hand held microphone shall be located to be easily accessible and to allow the microphone cable to be routed so that no interference with the operation of the bus will occur.

The amplification will be controlled through the Xerox radio system. Volume control will also be through the radio system controls. The unit shall be of sufficient power to drive the speakers providing clear and audible communication, without damage, for sustained periods of time. At full volume, the system must produce 95 dBA or greater exterior announcements measured 6 feet from the front door of the bus, and 88 dBA or greater interior announcements measured at any seating position. It is expected that the system will be fully compatible with VTA's replacement CAD/AVL system provided by Clever Devices.

The hand held microphone shall be from Midwest Electronics with a Midwest Electronics #195 control box or an approved equal system having equal or superior durability and ease of use.

TS 84.2.1 Speakers

A sufficient number of interior speakers, each 8 ohms and wired in parallel to present an impedance load between 8 and 16 ohms to the amplifier, shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. All speaker wiring will terminate in the radio control box. An all-weather rated speaker shall be provided outside the bus so that announcements can be clearly heard by passengers standing near the front door.

TS 84.3 Automatic Passenger Counter (APC)

The Automatic Passenger Counter (APC) system shall include a timer so that the APC continues to accurately calculate all boardings and de-boardings for 20 minutes after the bus ignition is turned off.

IRIS Matrix Infrared APC or product showing similar performance and reliability is to be provided. Sensors are to be installed at all doors. The system is to come complete, installed, programmed and calibrated. Provisions for a data connection to the Xerox radio system through the radio TIB which is installed in the Radio Equipment Enclosure are to be provided.

TS 84.4 Radio Handset and Control System

TS 84.4.1 Drivers Speakers

Not used.

TS 84.4.2 Handset

Contractor will install a handset for driver use.

TS 84.4.3 Driver Display Unit (DDU)

Not used, Agency will install after delivery.

TS 84.4.4 Emergency Alarm

Contractor shall install an emergency alarm that is accessible to the driver but hidden from view.

See also TS 79 paragraph (8), the destination sign emergency message switch shall be mounted, with exact location to be determined at the pre-production meeting. Pushing the switch once shall activate the destination signs to read 'HELP EMERGENCY CALL POLICE' and cause the four corner marker lights to flash. Pushing it twice shall reset the destination sign.

TS 84.5 WI-FI System

A system for on-board Wi-fi access shall be provided. It shall be an Icomera Moovbox system or approved equal fully compatible with VTA's electronic processes. At a minimum, it shall consist of one each Mobile Router, M220 Series Units w/one WiMAX module embedded, WiMAX radio, (embedded Clear and AT&T HSPA+ modules), 2 Ethernet ports (1POE), 12VDC – 36VDC Power Input, Transit and Clearwire network certified, part number: SPC-M220-RM-C-ATTHSP. Installation shall include 2 each L-Com, Interior Patch antennas, 4 inch Diameter, 7-9dBi ,with adequate Coax Leads, (Wi-Fi 2.4GHz), RP-TNC connector, white or other color to match interior mounting surface. Prior to build of the pilot bus, locations must be determined to assure complete interior coverage while the bus is turning. Final locations shall require VTA approval. Two external antennas shall be provided, A Mobile Mark cellular (no GPS) antenna model SPC-RM-WLF-3U-WHT-SPCL and a Mobile Mark SMW-UMB-3U-3X-2C 4G/ 3G/GPS, both with adequate Coax Leads, and a

5/8 inch diameter nipple with mounting nut. Approved equals will need to demonstrate superior range, directional coverage and durability. Both exterior antennas shall be white in color. All four Wi-fi antennas, interior and exterior, unless already mounted on an appropriate surface, must be installed with minimum 6 inch square ground planes.

TS 84.6 AVL/Radio System

Currently VTA is using the Xerox AMDT CAD/AVL system listed in this section. VTA in the process of upgrading to a state of the art system provided by Clever Devices. VTA expects the Proposer to work closely with Clever Devices to provide all of the needed vehicle level communications protocols to integrate Clever Device's "IVAN" system in a similar fashion to VTA's 2016 BAE hybrid fleet. At a minimum, VTA expects the system to provide live SOC ESS data. The intention is to use this data both in route and while charging in conjunction with driver & route information to provide an estimated vehicle range. Should the estimated range fall short of the route requirements with the bus's current state of charge, VTA operations shall be notified by the CAD/AVL system to either provide a relief bus, or dispatch a bus with more estimated range.

The VTA radio system is made by Affiliated Computer Services (ACS Xerox, formerly Orbital). It is their 2002 version AMDT CAD/AVL design. To accommodate the system, the following hardware shall be provided (except as noted).

1) For the equipment enclosure ("Radio box") the minimum volume shall be 15,000 cubic inches with minimum dimensions in each plane of 18 inches wide, 20 inches deep and 40 inches high. The enclosure shall be located directly behind the operator's area on the street side. The enclosure shall be as large as practical to facilitate future expansion of radio equipment. The enclosure shall be splash proof and properly ventilated when the service door is secured. It shall include modular slide out or fold down trays which are removable and can be repositioned to accommodate changes in equipment position as needed. Slide out trays shall incorporate heavy-duty slide or roller mechanisms to support a minimum of 150 lbs. of loading and shall be able to withstand the normal shock and vibration, (under full load) experienced in revenue service, without damage to the slide or roller mechanisms.

Trays shall be located so as to be easily accessible by a 50th percentile female for all component change outs.

Service light(s) with suitable switch shall be provided within the enclosure, exact locations will be subject to VTA approval.

2) The OEM shall bring the following signals into the radio box for interface with the ACS Xerox equipment:

   Odometer Signal:
   Odometer signal wiring shall be 20 AWG (Twisted Shielded Pair) from the odometer signal source to the radio box. 10 feet of spare odometer cable shall be coiled and left inside the radio box. An isolated odometer signal output from the sending unit shall be provided for this purpose. The odometer signal shall be a 5 volt square wave with the lowest point on the waveform at 0 VDC (ground). The signal shall have a duty cycle between 10 and 90 percent with a maximum frequency of 5 kHz. The frequency of the signal shall be linearly proportional to speed. The odometer signal source shall produce a minimum of 400 and not more than 250,000 pulses per mile.

   Emergency Alarm Switch Wiring:

20 AWG signal wire pair from the emergency switch location to the radio box. 10 feet of spare switch cable shall be coiled and left inside the radio box.

Power cables shall be run from a power distribution panel and be terminated at an accessible terminal strip in the radio box.

The OEM shall bring the following Main Power Requirement (from the vehicle's main power bus at the battery source) into the equipment enclosure:

- Red Wire Color unless otherwise specified, fused at source – (20 AMP for 12 Volt).
- Black Wire Color, unless otherwise specified, 24 and 12 VDC Return to Battery Ground (Chassis Return not acceptable), #6 AWG cable terminated at an accessible terminal block.
- 12V 15 Amp from the operator master switch providing power in Day (Run), Night and Park modes. #8 AWG wire minimum (Circuit breaker protected).

The power cables shall be run from a power distribution panel and terminated at an accessible terminal strip in the radio box.

Internal and External Speaker Wiring.
Internal / External Switch Wiring.
Microphone Wiring.
Mechanical Alarm including Stop Request, Wheel Chair, Front Door open sensor.

3) The OEM shall install a Radio Antenna ground plate in the roof section as required.

Cable distance from the radio GPS antenna (see below) to the radio box shall be less than 25 feet. The location of the antennas shall not be more than 10 degrees from horizontal.

NOTE: The GPS antenna / receiver must be located at least 1 meter from other radiating elements. There are 5 roof mounted antennas specified: WLAN antennas for the radio, the Surveillance system (Section 5.6.22) and the event data recorder. There is a GPS and a broadcast antenna for the radio system. All of these antennas must be located to assure no interference during use. The underside of all antennas shall be accessible for service of the antenna connector (The OEM shall install interior ceiling cover plates if needed).

4) Cable conduits shall be routed at the discretion of the transit organization to ease in cable replacement. Since cables are being installed during the bus build, the conduits should be considered on a case-by-case basis. These conduits should be 3/4" ID or larger and be routed in a continuous fashion. The conduit shall have bend radiuses that will permit the ease of pulling cables (no sharp or right angles).

Conduit shall be routed as follows:

From	Termination
Antenna, GPS Receiver	Radio Box Enclosure
Antenna, Radio Transceiver	Radio Box Enclosure

5) In addition to the OEM supplied items above, the OEM shall procure and install ACS Xerox provided equipment and cables at their factory as follows:

HANDSET
GPS ANTENNA / RECEIVER
Antenna, UHF,488-512 MHz, ASPC 572
INTERIOR SIGN(S)
APC ANALYZER(S)
APC SENSORS, 2 PER DOOR
AGC MIC
PA AMP
RADIO EQUIPMENT TRAY(S) INCLUDING:
MOUNTS
FUSE BLOCKS
POWER FILTER
TERMINAL STRIPS
TIB unit
MOUNTINGS FOR MOTOROLA MCS2000 radio
Assembly, Cable, AMDT/TIB, W01
Assembly, Cable, AMDT/TIB, W02
Assembly, Cable, J1708 Interface W03A
Assembly, Cable, AMDT Power, W04
Assembly, Cable, Radio Antenna W09
Assembly, Cable, Orbital PA Amplifier W12A
Assembly, Cable, Microphone Interface W12B
Assembly, Cable, Vehicle Power W14
Assembly, Cable, TIB to Handset W16
Assembly, Cable, Vehicle Interface W10A
Assembly, Cable, Vehicle Interface W10B
Assembly, Cable, GPS Antenna W22
CABLE ASSEMBLY RADIO CABLE COAX
W03B CABLE ASSEMBLY FRONT INTERIOR SIGN
CABLE ASSEMBLY(S) APC ANALYZER(S) TO J1708
CABLE ASSEMBLY APC DOOR CONTACT FRONT
CABLE ASSEMBLY APC DOOR CONTACT REAR
CABLE ASSEMBLY(S) APC SENSOR(S) FRONT
CABLE ASSEMBLY(S) APC SENSOR(S) REAR
CABLE ASSEMBLY AGC MIC
MECHANICAL MOUNTS AS REQUIRED FOR:
HANDSET
INTERIOR SIGN(S)
APC SENSORS
PA AMP

6) The GPS and radio antenna cables shall be routed from the antenna mount location to the radio box.

7) Switches for controlling the exterior annunciator included with the Xerox system shall be provided:

A push button switch shall be provided to allow the operator to repeat the message. The operator shall be able to repeat the announcement at any time while the bus is running. A speaker for the external annunciator, Mobilepage Model 1180 or approved equivalent with 8 ohm impedance and all-weather rating, which may be combined with the P/A speaker, must be located so that the Decibel level as measured on the 'A' scale is 5 dB lower at the operator's ear than at a spot 1.2 meters (4 feet) outboard of the entry door and 1.5 meters (5 feet) above the ground. The signal for initiating annunciation must be activated by the Operator's door control switch.

8) Removable fuses shall be provided on the radio box tray to allow disconnection of switched and constant power to the radio system for ease of servicing.

All routing of cables, in conduit or otherwise, shall observe minimum bend radius requirements of the cable manufacturer. Any cable installed shall be serviceable for maintenance purposes. A given cable shall be deemed serviceable if it can be accessed, removed and inspected with the aid of simple hand tools such as those necessary to remove panels or service covers.

The Automatic Passenger Counter (APC) system shall include a timer so that the APC continues to accurately calculate all boardings and de-boardings for 20 minutes after the bus ignition is turned off.

TS 85. Event Data Recorders (EDR)

No EDR shall be installed

TS 86. Approved Equals

Section not used.

TS 87. Spare Parts Package

The contractor shall furnish the following items as spare parts with the bus purchase, including the manufacturer's name and part#.
Complete electric drive system (including invertors, controllers, and harness, but excluding the ESS)
Complete electric air compressor system (including invertors, controllers, and harness)
Complete Electric hydraulic (pump including invertors, controllers, and harness)
Complete Lo-voltage convertor system (Beltless alternator)

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. Completed copy of CER 11 Warranty Schedule Form shall be submitted with the vendor's proposal.

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 for a minimum of two (2) years or 100,000 miles, whichever comes first, beginning on the date of acceptance, or conditional acceptance of each bus, in accordance with the section "Acceptance of Bus." The warranty is based on regular operation of the bus under the operating conditions prevailing in VTA's locale.

WR 1.1.3 Body and Chassis Structure

Body, body structure, and structural elements of the suspension are warranted to be free from defects, and to maintain structural integrity for a minimum of three (3) years or 150,000 miles, whichever comes first, beginning on the date of acceptance, or conditional acceptance of each bus, in accordance with the section "Acceptance of Bus."

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 minimum period of twelve (12) years or 500,000 miles, whichever comes first, beginning on the date of acceptance, or conditional acceptance of each bus, in accordance with the section "Acceptance of Bus."

WR 1.1.4 Propulsion System

Propulsion system components, specifically the complete electric drive system, energy storage system and both drive and non-drive axles shall be warranted to be free from defects for a minimum of five (5) years or 300,000 miles, whichever comes first, beginning on the date of acceptance, or conditional acceptance of each bus, in accordance with the section "Acceptance of Bus."

No component or sub-component warranty exclusions shall be accepted.

WR 1.1.5 Emission Control System (ECS)

This solicitation is for a fully electric bus. VTA expects that there should be no measurable vehicle emissions that will pollute the air.

WR 1.1.6 Subsystems

Major subsystems shall be warranted to be free from defects, for a minimum of three (3) years or 150,000 miles, whichever comes first, beginning on the date of acceptance, or conditional acceptance of each bus, in accordance with the section "Acceptance of Bus." Major subsystem manufacturers' standard warranty, delineating any items excluded from this warranty, shall be submitted in accordance with Communications of this RFP. Items included as Major Subsystems are listed below:

- Brake system
- Heating, Ventilating, and Air conditioning system
- Door systems
- Air compressor and dryer
- Wheelchair ramp
- Lo-voltage Converter

- Hydraulic pump and system
- Steering system

For Destination Signs, a five (5) year warranty for parts and labor, with an additional five (5) year warranty for parts only, must be provided.

WR 1.1.7 Extended Warranty

See Warranty information above

WR 1.1.8 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:

- ESS
- ESS battery cells
- Electric drive system components
- alternator
- A/C compressor and condenser/evaporator unit
- drive axle
- power steering unit
- air compressor
- wheelchair ramp

The Contractor shall provide updated serial numbers resulting from warranty campaigns. The format of the list shall be approved by VTA prior to delivery of the first production bus.

In addition to the hardware serial numbers the Contractor shall provide the software version and revision level for every component that has a micro-controller or other PLC system.

WR 1.1.9 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 1.1.10 Charging Systems

All charging systems ordered on this contract are warranted to be free from defects and shall function as intended for a minimum of three (3) years, beginning on the date of acceptance, or conditional acceptance of the last bus delivered. This shall be independent of the kWh through put, hours of operation, or charge and discharge cycles.

- 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.
- The submitted maintenance program shall include a comprehensive service manual
- The submitted maintenance program shall include a comprehensive parts break down and manual.

- The Agency will use its own staff 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 maintain detailed records of all inspections, calibrations, tests, maintenance and repairs.

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 VTA 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. VTA 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 VTA

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 VTA'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 VTA to assign its warranty obligations to others, but only on a case-by-case basis, approved in writing, by VTA. 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.

When requesting a waiver to pass the warranty requirement on to a sub-supplier the Contractor must supply VTA with the complete sub-supplier warranty information. It will be the contractor's responsibility to manage any sub-supplier warranty that was not included in the warranty waivers. This includes pass-through warranties that are requested by the contractor but for which the sub-supplier warranty was not included with the waiver. It is expected that the Contractor is ultimately responsible for all warranty costs, including warranties that are pass through.

WR 1.3.2 Superior Warranty

The Contractor shall pass on to VTA any warranty offered by a component Supplier that is superior to that required herein. The Contractor shall provide a list to VTA 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 in a minimum fleet size of twelve (12) or more buses where such items are covered by warranty. A Fleet Defect shall apply only to the all warranty periods 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, VTA 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. VTA may immediately declare a defect in design resulting in a safety hazard to be a Fleet Defect. The Contractor shall be ultimately responsible to furnish, install and replace all defective units independent of any warranty pass through waivers.

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, VTA will allow the Contractor or its designated representative to perform such work. At its discretion, VTA 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 VTA 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 two (2) calendar days after receiving notification of a Defect from VTA. VTA 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 and tools required to complete repairs. At VTA's option, the Contractor may be required to remove the bus, at Contractor's own expense, from VTA's property while repairs are being effected. If the bus is removed from VTA's property, then repair procedures must be diligently pursued by the Contractor's representative.

Should the bus be removed from VTA property by the Contractor, or designated representative preforming the warranty work, they shall provide a warranty work status update to VTA at a minimum interval of five (5) business days. The warranty work status update shall include all parts used to date for the warranty repair, a brief description of the work completed to date, and any other relevant information regarding the warranty repair.

WR 2.3 Repairs by the Agency

WR 2.3.1 Parts Used

If VTA performs the warranty-covered repairs, then it shall correct or repair the defect utilizing parts supplied by the Contractor specifically for this repair. At its discretion, VTA may use Contractor-specified parts available from its own stock if deemed in its best interests.

WR 2.3.2 Contractor-Supplied Parts

VTA may require that the Contractor supply parts for warranty-covered repairs being performed by VTA. Those parts may be remanufactured but shall have the same form, fit and function, and warranty. The parts shall be shipped, prepaid to VTA, 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 VTA, 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 sixty (60) calendar days of the receipt of failed parts. Failure reports are to include detailed technical information about each failure type and mode. The Contractor shall provide suggested repairs or mitigation strategies for each failure mode. At the end of the warranty period the Contractor is to provide detailed service and repair instructions to VTA which will allow VTA to repair any remaining components in the fleet that may fail as a result of the identified failure modes.

WR 2.3.5 Reimbursement for Labor and Other Related Costs

VTA shall be reimbursed by the Contractor for labor. The amount shall be determined by VTA for a qualified mechanic at a straight time wage rate, which includes fringe benefits and overhead adjusted for VTA'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 VTA's service garage at the time the defect correction is made. At the time of publication of this RFP, the current VTA wage rate is $110 per hour.

WR 2.3.6 Reimbursement for Parts

Contractor shall reimburse VTA 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 fifteen percent (15%) handling costs up to a maximum handling charge of $250 per part. Handling costs shall not be paid if parts are supplied by the Contractor and shipped to VTA.

WR 2.3.7 Reimbursement Requirements

The Contractor shall respond to the warranty claim with an accept/reject decision within two (2) business days after VTA submits the claim. Contractor shall provide a failure analysis no later than sixty (60) days after VTA submits the claim and defective part(s), when requested. Reimbursement for all accepted claims shall occur no later than sixty (60) days from the Contractor's "accept" decision of a valid claim. VTA may dispute rejected claims or claims for which the Contractor did not reimburse the full amount. The parties agree to review disputed warranty claims within ninety (90) days to reach an equitable decision to permit the disputed claim to be resolved and closed.

WR 2.4 Warranty after Replacement/Repairs

If any component, unit or subsystem is repaired, rebuilt or replaced by the Contractor or by VTA 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 (5) 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 VTA.

WR 2.4.1 Warranty Processing Procedures

The following list represents requirements by the Contractor to VTA 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

It is preferred that Contractor have provisions for electronic filing of warranty claims with their company, utilizing either the Internet or a direct dial-up connection subject to VTA's approval. VTA's forms will be accepted by the Contractor if all of the above information is included.

WR 2.6 Return of Parts

When returning defective parts to the Contractor, VTA shall tag each part with the following:

- bus number and VIN
- claim number
- part number
- serial number (if available)

WR 2.7 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 2.8 Reimbursements

Reimbursements are to be transmitted to the following address:

Santa Clara Valley Transportation Authority
Attn: Keisha Carnahan
Building A
3331 North First Street
San Jose, CA. 95134

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 VTA 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 VTA.

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, Drive unit 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

VTA shall be represented at the Contractor's plant by resident inspectors, as required by FTA. Resident inspectors may be Agency employees or outside contractors. VTA 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. VTA 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 at the end of this Contract.

QA 2.2.2 Pre-Production Meetings

The primary resident inspector may participate in design review and Pre-Production Meetings with VTA. 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 VTA 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, high speed internet connection capable of VPN connections to the VTA home office, file cabinet, chairs, and clothing lockers sufficient to accommodate the resident staff.

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 VTA'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 VTA. These acceptance tests shall include pre-delivery inspections and testing by the Contractor and inspections and testing by VTA 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 VTA. 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 VTA.

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." VTA 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 under floor equipment shall be available for inspection by the resident inspectors, using a pit or bus hoist provided by the Contractor. A hoist, scaffold or elevated platform shall be provided by the Contractor to easily and safely inspect bus roofs. Delivery of each bus shall require written authorization of the primary resident inspector. Authorization forms for the release of each bus for delivery shall be provided by the Contractor. An executed copy of the authorization shall accompany the delivery of each bus.

QA 3.2.1 Visual and Measured Inspections

See attachment A.

QA 3.2.2 Total Bus Operation

See attachment A.

QA 4. Agency-Specific Requirements

No additional requirements

CER 1. Price Schedule

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Price Schedule

Item #	Quantity	Item	Unit Price	Total
1.	5	40' Battery Electric Transit Bus	$_____	$_____
2.	5	Electric Bus Chargers	$_____	$_____
3.	1	Charger Installation/Validation	$_____	$_____
4.	1	Specialty Tool Package (insert total from specialty tool package)		$_____
5.	1	Training Aids Package (insert total from training aids package)		$_____
6.	1	Spare Parts Package (insert total from spare parts package)		$_____
			Sub Total	$_____
		*City of San Jose Sale Tax (use 9.00%)		$_____

* California Sales Tax shall not be applicable to wheelchair ramp and accessories as required for the disabled, including restraints, additional barriers and flip-up seats.

7.	5	Passenger Ramps	$_____	$_____
8.	5	Flip-up Seats	$_____	$_____
9.	5	Wheelchair Restraint Systems	$_____	$_____
10.	5	Additional Curbside Wheelchair Restraint Package (TS 80.5)	$_____	$_____
11.	5	Annunciator Systems	$_____	$_____
12.	5	Destination Sign Systems	$_____	$_____
13.	1	Training Labor (insert total from training labor package)		$_____
14.	5	Delivery Costs	$_____	$_____
		Total shall include freight charges		
		Total Proposal Price	$_____	$_____
		Cash Terms	_____% 10 days, net 30	

CER 1. Price Schedule

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Specialty Tools Package (sub-list)
(Per TS 5.6.4)

Item #	Item	Qty.	Unit Price	Total
1.	Digital Multi-meter (Fluke 88V & TLK282)	1	$_____	$_____
2.	Digital Current Clamp (Fluke 375)	1	$_____	$_____
3.	4-Channel Scope (PicoScope Advanced Kit)	1	$_____	$_____
4.	PLC logic tester & interface	1	$_____	$_____
5.	Special ESS Diagnostics & Software	1	$_____	$_____
6.	ESS module stand	1	$_____	$_____
7.	Laptop (durabook S15AB)	1	$_____	$_____
8.	Battery Analyzer (Fluke BT521)	1	$_____	$_____
9.	Thermal Imager (Fluke Ti400)	1	$_____	$_____
10.	Electric Drive Diagnostics & Software	1	$_____	$_____
11.	Electric Drive adapters for overhaul	1	$_____	$_____
12.	Electric Drive Dyno Connection	1	$_____	$_____
13.	Motor Power quality analyzer (Fluke 438-II)	1	$_____	$_____
14.	Insulation tester (Fluke 1550C)	1	$_____	$_____
15.	RF spectrum analyzer (Tektronics RSA306)	1	$_____	$_____
16.	Brake System Diagnostics & Software	1	$_____	$_____
17.	ABS Sensor R&R Kit	1	$_____	$_____
18.	Disc Brake Repair Kit	1	$_____	$_____
19.	Differential & Propeller maintenance tools	1	$_____	$_____
20.	Differential overhaul tool sets	1	$_____	$_____
21.	Hub Repair Kit	1	$_____	$_____
22.	Pinion Seal Repair Kit	1	$_____	$_____
23.	Special steering tools/pullers	1	$_____	$_____

CER 1. Price Schedule
VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Specialty Tools Package (sub-list)
(Per TS 5.6.4)

Item #	Item	Qty.	Unit Price	Total
24.	Destination sign diagnostics software	1	$_____	$_____
25.	Tow adapters (if required)	3	$_____	$_____
26.	Body Dimension Analysis Tool	1	$_____	$_____
27.	Metal Analysis Tool	1	$_____	$_____
28.	Ultra Sonic Weld Analysis Tool	1	$_____	$_____
29.	Advanced Noise/Sound Analysis Tool	1	$_____	$_____
30.	Composite Structure Analysis Tool	1	$_____	$_____
	Total Specialty tools Package Cost			$_____

VTA may purchase all or part of the specialty tools package

CER 1. Price Schedule

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Training Aids Package (sub-list)
(Per TS 5.6.3)

Item #	Item	Qty	Unit Price	Total
1.	PLC Training Board	1	$_____	$_____
2.	Standalone Destination Sign System	1	$_____	$_____
3.	ESS module (without battery cells)	1	$_____	$_____
	Total Training Aids Package Cost			$_____

VTA may purchase all or part of the training aids package

CER 1. Price Schedule

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Spare Parts Package (sub-list)
(Per TS 87)

Item #	Item	Qty.	Unit Price	Total
1.	Electric Drive System*	1	$_____	$_____
2.	Electric Air Compressor system	1	$_____	$_____
3.	Electric Hydraulic pump System	1	$_____	$_____
4.	Lo-Voltage Converter (DC-DC)*	1	$_____	$_____
	Total Spare Parts Package Cost			$_____

*2 each if more than one is used on coach

VTA may purchase all or part of the spare parts package

CER 1. Price Schedule

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Training Labor (sub-list)
(Per TS 5.6)

Item #		Days	Per Day	Total
1.	Mechanics Training-orientation	1	$_____	$_____
2.	Mechanics Training-technical	55	$_____	$_____
3.	Mechanics Training-stand-alone classes	13	$_____	$_____
4.	Stores Training	1	$_____	$_____
5.	Operator Training	3	$_____	$_____
Item #		Class	Per Class	Total
6.	Train-the-Trainer Training	6	$_____	$_____
Item #		Sets	Per Set	Total
7.	Instructional material	9	$_____	$_____

Total Training Labor Package Cost $_____

CER 1. Price Schedule

VTA #P16265 40' LOW FLOOR FULL BATTERY ELECTRIC TRANSIT BUSES

Proposer _____

By _____ Date _____

CER 2. Proposer's Checklist

RFP P16265 40' Low Floor Battery Electric Transit Buses

Package 1: Technical Proposal

- ☐ 1. Letter of Transmittal
- ☐ 2. Technical Proposal
- ☐ 3. CER 10 Vehicle Technical Information
- ☐ 4. Contractor Service and Parts Support Data
- ☐ 5. Form for Proposal Deviation (without pricing data)-must be sent on CD/Flashdrive in editable word format
- ☐ 6. Engineering organization chart, engineering change control procedure, field modification process
- ☐ 7. Manufacturing facility plant layout, other contracts, staffing
- ☐ 8. Production schedule and other Contract commitments for the duration of this Contract.
- ☐ 9. Quality Assurance Program
- ☐ 10. Management Plan
- ☐ 11. Complete warranty documentation including all sub-supplier warranty policies, including CER 11 – Warranty Schedule

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)
- ☐ 3. Deviations (with pricing information)

Package 3: Qualifications Package

- ☐ 1. Pre-Award Evaluation Data Form
- ☐ 2. Acknowledgement of Addenda
- ☐ 3. References and non-priced information (if provided by Proposer)
- ☐ 4. 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 VTA
- ☐ 5. Letter for insurance, indicating the Contractor's ability to obtain the required insurance coverage amount for each type of insurance in accordance with the RFP requirements.
- ☐ 6. Letter from a surety for a Performance Guarantee, if required, indicating the Contractor's ability to obtain all of the financial guarantee requirements in accordance with the RFP requirements; Offer Guarantee, Performance Bond, Payment Bond, and Warranty Bond.
- ☐ 7. Letter of commitment for parental financial guarantee (if applicable)
- ☐ 8. Proposal Form
- ☐ 9. 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
- ☐ 10. Certificate of Compliance with Software Escrow Account Requirements.

Package 4: Proprietary/Confidential Information

☐ 1. Proprietary/Confidential Information

☐ 2. Trade Secrets

* 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 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on November 21, 2016.

VTA RFP P16265 40' Low Floor Full Battery Electric Transit Buses

Request #: **Proposer:** **RFP Section:** **Page:**	
Questions/clarification:	
Agency action:	☐ Approved ☐ Denied ☐ Request More Info/Clarification ☐ See addendum ☐ See response below
Agency response:	

CER 4. 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.

VTA RFP P16265 40' Low Floor Full Battery Electric Transit Buses

– 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 5. Contractor Service and Parts Support Data

VTA RFP#P16265 40' Low Floor Full Battery Electric Transit Buses

– **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 6. Form for Proposal Deviation or Approved Equal

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 of each of the requested deviations without any price/cost information is to be placed in the Technical Proposal, as specified in "Technical Proposal Requirements". A separate copy of each of the requested deviations with any price/cost information should be placed in the Price Proposal as specified in "Price Proposal Requirements." This form is for informational purposes and does not modify the RFP. RFP modifications will only be made by means of issuing an addendum, not through this form. Proposer shall complete the areas above the shaded strip and attach any supporting documentation to this form. The CER 6. Form for Proposal Deviation or Approved Equal is due by the Proposal Due Date deadline.

VTA RFP#P16265 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:		Contractor:	RFP section:	Page:	Deviation Price: (Do not fill in for the submissions in Technical Proposal Package-Leave Blank) (Fill In Deviation Prices for the Pricing Package Submission only)
	Complete description of Deviation:				
	Rationale "pros and cons" (list any attachments):				
	VTA's Use Only _____		Date Agency Received:		
Agency action:		□ Approved	□ Approved w/Conditions	□ Request More Info/Clarification	
		□ See addendum	□ Denied	□ See response below	
	Agency response:				

CER 7. Pre-Award Evaluation Data Form

VTA RFP P16265 40' Low Floor Full Battery Electric Transit Buses

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 VTA (This may require execution of an acceptable non-disclosure agreement between VTA 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 $100,000.

Proposer shall sign only one signature block on the certificate. Signing both signature blocks will make the Proposal **nonresponsive**.

– Certificate of Compliance

The Proposer hereby certifies that it will comply with the requirements of 49 USC Section 5323(j)(2)(C), Section 165(b)(3) of the Surface Transportation Assistance Act of 1982, as amended, and the regulations of 49 CFR 661.11:

Name and title:
Company:
Vehicle VIN:

Authorized signature Date

Certificate of Non-Compliance

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

Name and title:
Company:
Vehicle VIN:

Authorized signature Date

CER 8.2 Non-Collusion Affidavit

This affidavit is to be filled out and executed by the Proposer; if a corporation makes the proposal, 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 proposal)

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 Authority, is directly or indirectly interested therein.

_____
Signature of Affiant Date

Sworn to before me this _____ day of _____, 20_____.

_____
Notary public my commission expires

– Seal

CER 8.3 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 subawards at all tiers (including subcontracts, subgrants and contracts under grants, loans and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31, 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 8.4 Certificate of Compliance with Bus Testing Requirement

(revised 9/1/2016)

The undersigned certifies that the vehicle offered in this procurement complies and will, when delivered, comply with: (i) 49 USC 5318, as amended by the Fixing America's Surface Transportation Act (FAST Act) and Section 20014 Moving Ahead for Progress in the 21st Century Act (MAP -21); and (ii) FTA's implementing regulation at 49 CFR Part 665. See also Federal Register Vol. 81, No. 147 (Published August 1, 2016).

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) and have _____(enter Passed/Failed) the test with an overall test score of _____. 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 VTA 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 8.5 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 8.6 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 8.7 Certificate of Compliance with Software Escrow Account Requirements

The undersigned certifies that upon Contract award, the Transit Vehicle Manufacturer (TVM) shall enter into a Software Escrow Account in compliance with the SP 10. Software Escrow Account section of the solicitation.

Company name:
Name and title of the Proposer's authorized official:

Authorized signature Date

CER 9. Other Certifications

CER 9.1 Proposal Form

NOTE: The following is an example of a Proposal form to be modified as appropriate by VTA and included in the RFP.

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 VTA in response to Request for Proposal No. P16265, 40 Ft. Low Floor Full Battery Electric Buses, in its entirety.

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 9.2 Notice of Award

By execution below, VTA accepts Proposal as indicated above.

Contract Administrator:

_____

_____

Authorized signature Date

CER 9.3 Levine Act Form

Prime Proposer and Sub-consultants must submit a signed Levine Act Statement

California Government Code § 84308, commonly referred to as the "Levine Act," precludes an elected or appointed officer, or alternate, of a local government agency from participating in the award of a contract if he or she receives any contributions totaling more than $250 in the 12 months preceding the pendency of the contract award, and for three months following the final decision, from the person or company awarded the contract. This prohibition applies to contributions to the officer, or received by the officer on behalf of any other officer, or on behalf of any candidate for elective office or on behalf of any committee in federal, state or local elections.

VTA's Board members and their alternates as of the date of this RFP are as follows:

Name	Title	Represents
Perry Woodward	Chairperson	City of Gilroy
Cindy Chavez	Vice Chairperson	County of Santa Clara
Ash Kalra	*VTA* Board Member	City of San Jose
Johnny Khamis	*VTA* Board Member	City of San Jose
Magdalena Carrasco	*VTA* Board Member	City of San Jose
Raul Peralez	*VTA* Alternate Board Member	City of San Jose
Rose Herrera	*VTA* Board Member	City of San Jose
Sam Liccardo	*VTA* Board Member	City of San Jose
Jeannie Bruins	*VTA* Alternate Board Member	City of Los Altos
Rich Larsen	*VTA* Board Member	Town of Los Altos Hills
Howard Miller	*VTA* Alternate Board Member	City of Saratoga
Jason Baker	*VTA* Board Member	City of Campbell
Larry Carr	*VTA* Alternate Board Member	City of Morgan Hill
David Whittum	*VTA* Board Member	City of Sunnyvale
Jamie L. Matthews	*VTA* Alternate Board Member	City of Santa Clara
Jose Esteves	*VTA* Board Member	City of Milpitas
Dave Cortese	*VTA* Alternate Board Member	County of Santa Clara
Ken Yeager	*VTA* Board Member	County of Santa Clara

1. Have you or your company, or any agent on behalf of you or your company, made any contributions of more than $250 to any *VTA* Board member or alternate in the 12 months preceding the date of the issuance of this RFP?

   No ___ Yes ___ Please identify the Board member or alternate:_____

2. Do you or your company, or any agency on behalf of you or your company, anticipate or plan to make any contributions of more than $250 to any *VTA* Board member or alternate in the three months following the award of the contract?

   No ___ Yes ___ Please identify the Board member or alternate:_____

Answering yes to either of the two questions above does not preclude *VTA* from awarding a contract to your firm. It does, however, preclude the identified Board member or alternate from participating in the contract award process for this contract.

Signature:_____ Firm Name:_____Date: ____

CER 9.4 Offer Guarantee Bond Form

This form is to be completed and included in the Price Proposal Package.

BOND

KNOW ALL PEOPLE BY THESE PRESENTS:
That we, _____

as Principal and _____as Surety, are held and firmly bound unto the Santa Clara Valley Transportation Authority, a political subdivision of the State of California (hereinafter called "VTA") in the penal sum of **5% of the total offer price** of the Principal above named, submitted by said Principal to VTA for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The condition of this obligation is such that an Offer to VTA for furnishing 40' Low Floor Full Battery Electric Transit Buses, RFP No. P16265, was submitted by Principal to VTA.

NOW THEREFORE, if the aforesaid Principal shall not withdraw said offer within **120 calendar days** after said opening, and shall within the period specified therefore, or if no period be specified, within **15 days** after the prescribed forms are presented to Principal for signature, enter into a written contract with VTA in the prescribed form in accordance with the Offer as accepted, and file the Performance Bond with VTA guaranteeing faithful performance of the work under the Contract or in the event of the withdrawal of said Offer within the period specified or the failure to enter into such contract and give such bond within the time specified, if the Principal shall pay VTA the difference between the amount specified in said Offer and the amount for which VTA may procure the required work, if the latter amount be in excess of the former, together with all costs incurred by VTA in again requesting proposals, should that become necessary, then the above obligation shall be void and of no effect, otherwise to remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract on the request for proposals, or to the work to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation under this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said Contract or the request for proposals, or to the work, or to the specifications.

In the event suit is brought upon this Bond by VTA and judgment is recovered, the Surety shall pay all costs incurred by VTA in such suit, including a reasonable attorney's fee to be fixed by the court in accordance with applicable statutory law.

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this _____ day of _____, 20_____.

PRINCIPAL:	SURETY:
_____ (Company)	_____ (Company)
_____ (Signature)	_____ (Signature)
_____ (Name – Please Print)	_____ (Name – Please print)
_____ (Title)	_____ (Title)

NOTE: Signatures of those executing for Surety must be acknowledged by a Notary.

CER 10 Vehicle Technical Information

This form must be completed and included in the Technical Proposal.

GENERAL COACH DATA SHEET

RFP #P16265 40' Low Floor Full Battery Electric Transit Buses

Bus manufacturer:	
Bus model:	
Understructure manufacturer:	
Model number:	

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	

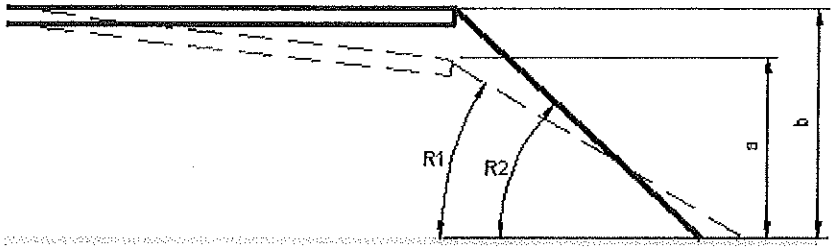
Dimensions

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)

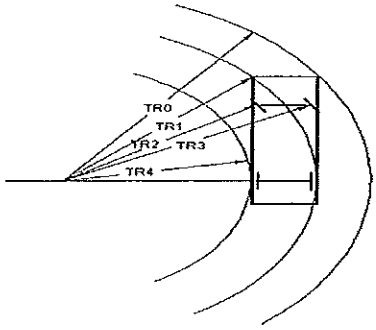
At front door		in.
At front axle		in.
At drive axle		in.
At rear door		in.

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)		ft^2		
Minimum distance between wheelhouses:	Front			in.
	Rear			in.
	Center			in.
Maximum interior floor slope (from horizontal)		deg		
Interior step height, first step		inches		
Interior step height, second step		inches		
Interior step width		inches		

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 fare box											
Fully seated, full fuel and fare box											
Fully loaded standee and fully seated, full fuel and fare box											
Crush load (1.5x fully loaded)											
GVWR											
GAWR											

Vehicle performance information/graphs to be attached with this form:

Drive speed vs. road speed
Torque vs. drive speed
Horsepower vs. drive speed
Energy consumption vs. drive 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

Electric drive or transmission

Manufacturer				
Type				
Speeds				
Gear ratios	Forward:		Reverse:	
Shift speeds (if applicable)				
1st–2nd		mph		
2nd–3rd		mph		
3rd–4th		mph		
4th–5th (if applicable)		mph		

5th–6th (if applicable)		mph

Maximum Ratio	
Minimum Ratio	
Continuous Power at output shaft	
Continuous Torque at output shaft	
Peak Power at output shaft	
Peak Power at output shaft	
Peak Torque at output shaft during regen	

Energy Storage System

Type				
Cell MFG & Model				
Number of cells				
Cell Chemistry				
Cell Voltage		Min		Max
Number of Modules				
Module Voltage				
Module Energy Cap.				kWh
Module, Weight				lbs
Battery pack voltage				V
Battery Pack Cap.				kWh
Battery, Weight				Lbs.

Vehicle Range Estimates With GVWR Passenger Load At Various Ambient Temperatures

100 F	80 F	60 F	30 F

Battery Pack SOC Cycle Life (percentage of remaining battery capacity after complete cycles)

1000 Cycles	2000 Cycles	3000 Cycles	4000 Cycles

Battery Pack SOC Capacity After Energy Throughput

330,000 kWh	660,000 kWh	990,000 kWh	1,320,000 kWh

Voltage regulator

Manufacturer	
Model	

Voltage equalizer

Manufacturer	
Model	

Alternator (Lo-Voltage Converter)

Manufacturer		
Type		
Model		
Output at idle		amps
Output at maximum speed		amps
Maximum warranted speed		rpm
Speed at idle (approximately)		rpm
Drive type		

Air compressor

Manufacturer		
Type		
Rated capacity		CFM
Capacity at idle (approximately)		CFM
Capacity at maximum speed (engine)		CFM
Capacity at maximum (@ 90 Psi)		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		lbs
Axle load		lbs

Second (if required)

Manufacturer	
Type	
Model number	

Gross axle weight rating		lbs
Axle load		lbs

Third

Manufacturer		
Type		
Model number		
Gross axle weight rating		lbs
Axle load		lbs
Axle ratio		

Suspension system

Manufacturer		
Type:	First:	
	Second:	
	Third:	
Springs:	First:	
	Second:	
	Third:	

Joint (If required)

Manufacturer	
Type	
Model number	

Wheels and tires

Wheels

Make	
Size	
Capacity	
Material	

Tires

Manufacturer	To be provided by VTA

Steering, power

Pump

Manufacturer and model number		
Type		
Relief pressure		psi

Pump Motor

Manufacturer and model number	
Type (AC/DC, Voltage)	
Max speed	RPM
Max Power	kW
Inverter: MFG & Model (if equipped)	

Booster/gear box

Manufacturer and model number	
Type	
Ratio	

Power steering fluid capacity	gal
Maximum effort at steering wheel	lbs (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

First:	Manufacturer	
	Part number	
	Diameter	in.
Second:	Manufacturer	
	Part number	
	Diameter	in.
Third:	Manufacturer	

Part number	
Diameter	in.

Brake lining manufacturer	
Type	

Brake lining 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 lengths

First		in.
Second		in.
Third		in.

Brake lining thickness _____ in.

Brake lining 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 ____ quarts

Engine thermostat temperature setting: Initial opening (fully closed) ____ °F

Fully open ____ °F

Overheat alarm temperature sending unit setting ____ °F

Shutdown temperature setting ____ °F

Cooling Fan system

Manufacturer

Type

Model number

Number of fans

Air reservoir capacity

Supply reservoir ____ in.^{3}

Primary reservoir ____ in.^{3}

Secondary reservoir ____ in.^{3}

Packing reservoir ____ in.^{3}

Accessory reservoir ____ in.^{3}

Other reservoir type ____ in.^{3}

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 ____ lbs

Oil capacity Dry ____ gal

Refrigerant: Wet [ ] gal Type [ ] [ ] lbs

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 [ ] lbs

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

Not Required	

Controls

Manufacturer	
Model	

Driver's heater

Manufacturer		
Model		
Capacity		Btu/hr

Ventilation system

Type	

Coolant heater

Not Required	

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		lbs
Width of platform		in.
Length of platform		in.
Ramp cycle time		seconds
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.
Streetside destination		
Rear route		in.

Character height

Front destination		in.
Front route		in.
Streetside destination		
Curbside destination		in.
Rear route		in.

Number of characters

Front destination	
Front route	
Curbside destination	
Streetside destination	
Rear route	

Message width

Front destination		in.
Front route		in.
Curbside destination		in.
Streetside destination		
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			

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	

Fire suppression system

Manufacturer	
Model number	
Fire detectors	
Suppression Media	
Nozzles (number & type)	
Tank capacity	

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		

Electronic tire pressure monitoring system

Manufacturer	
Model number	

Electronic brake stroke/wear indicator system

Manufacturer	
Model number	

NOTE: All information above is accurate to the timeframe upon submission. VTA reserves the right to update above data if changes occur, upon consultation with the customer.

CER 11: WARRANTY SCHEDULE

SANTA CLARA Valley Transportation Authority

40' Low Floor Full Battery Electric Transit Bus BUS WARRANTY COVERAGE SCHEDULE RFP: #P16265					
SYSTEM/SUBSYSTEM COMPONENTS	**YEARS**	**MILEAGE**	**Manufacturer**	**Warranty Administrator During Complete Bus (Bumper to Bumper) First 2 Years**	**Warranty Administrator After 2 Years**
Complete Bus (Bumper to Bumper)					
Battery (Low Voltage)					
Charging System					
LED LAMP ASSEMBLIES					
Structural Integrity/ Corrosion/Fatigue - Class 1 or Class 2 Failure					
Body/Chassis /Suspension Structure					
Electric Cooling system					
HYBRID/ELECTRIC DRIVE SYSTEM	**YEARS**	**MILEAGE**			
Electric Drive Unit					
Electric Drive Power Inverter					
Energy Storage System (ESS)					
Transmission Control Module (TCM)/Drive System Controller					
Vehicle Control Module (VCM)					
Push Button Shift Selector					
DC-DC Convertor (High Voltage to 24V)					
High Voltage Power Distribution Module					
Air Compressor Electric Drive System & Control					
Hydraulic Pump Electric Drive System & Control					
BRAKE/ABS SYSTEM (Excluding Shoe Asm & Drums/Rotors)					
Chambers					
Slack Adjusters					
Spider Asm					
Camshafts					
Hub Cap Asm					
Ring ABS					
Destination Signs/Control System					
Controller Assembly					
Digital Recorder Box					
Control Console					
Heating Air Conditioning System (HVAC)					
A/C Compressor					
Condenser/Motors					
Drive Belt					
High Voltage Drive System & Controller					
Blowers/fans					
OTHER MSC SYSTEMS/COMPONENTS	**YEARS**	**MILEAGE**			
Door Assembly Systems (Front/Rear)					
Video Surveillance System					
Wheelchair Ramp System					
Radiator Assembly					
Steering (Gear) Assembly					
Power Steering Pump					
Suspension (Air Bags/Shocks/Rods) System					
Drive Axle/ Differential/Drive Shaft					
Driver's Seat Assembly (Cushions)					
Passenger Seat Assembly (Cushions)					
Wheelchair Restraint System					

SECTION 10: CONTRACT

EXEMPLAR CONTRACT NO. P16265

THIS CONTRACT ("Contract") is between Proterra, Inc. (Contractor) and the Santa Clara Valley Transportation Authority (VTA).

This Contract expresses the terms and conditions for the purchase of 5 Low Floor Full Battery Electric Transit Buses of the Standard configuration.

Contractor and VTA, for the consideration hereinafter named, agree as follows:

1. SCOPE OF WORK

Contractor shall furnish all necessary qualified personnel, labor, materials, tools, equipment, technical expertise, services and incidentals to furnish 40 Ft. All Electric Buses as described in the Scope of Work and Specification of the Request for Proposal (RFP) document, therefore entitled:

RFP P16265
40' Low Floor Full Battery Electric Transit Buses

dated NOVEMBER 4, 2016, and including the following documents:

1) Any Addenda Issued
2) Contractor's Proposal Response, dated November 30, 2016
3) Request for Proposal Clarifications, dated
4) Request for Best and Final Offer (BAFO), dated
5) Contractor's BAFO, dated

all of which are incorporated herein by reference as though fully set forth, and are now known as and referenced as Contract No.P16265.

2. TERM OF CONTRACT

This Contract is effective as of the last date set forth by the Parties executing this Contract. The Contractor shall commence work after the effective date of the Contract. The Contract completion date shall be 15 days after the delivery of final bus.

The base Contract will contain orders for five (5) 40' Low Floor Full Battery Electric Transit Buses. The Contract delivery date for the 5 buses shall be no later than December 20, 2017.

3. CONTRACT PRICE

VTA shall pay Contractor at the rates Proposed on the Pricing Schedule in the Revised BAFO dated _____, submitted by Contractor in response to the above referenced specifications. The contract price for five (5) 40' Low Floor Full Battery Electric Transit Buses is set forth in Exhibit A, Pricing, attached to and made a part of this Contract.

4. SERVICE OF NOTICE

Any notice required or permitted to be given by this Contract shall be deemed given when personally delivered to recipient thereof or mailed by registered or certified mail, return receipt requested, postage prepaid, to the appropriate recipient thereof, in the case of the Contractor at the business address specified in its proposal and in the case of VTA, at 3331 North First Street, Building A, San Jose, CA 95134-1927, or at any other address which either party may subsequently designate in writing to the other party.

5. ENTIRE AGREEMENT

This Contract constitutes the complete and entire agreement between VTA and the Contractor and supersedes any prior representations, understandings, communications, commitments, agreements or Proposal, oral or written, that are not incorporated as a part of the Contract.

SANTA CLARA VALLEY TRANSPORTATION AUTHORITY

PROTERRA, INC.

IN WITNESS WHEREOF, VTA AND CONTRACTOR HAVE EXECUTED THIS AGREEMENT AS OF THE LAST DATE SET FORTH BELOW:

Nuria I. Fernandez Date
General Manager /CEO

Signature Date

Printed Name

Title:

Approved as to Form:

VTA Counsel Date

Attachment A: New Bus Manufacturing Inspection Guidelines

Pre-Production Meeting

Responsibilities

Agency

- Provides 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 VTA.
- Last vehicle on production line.
- Last vehicle off production line.
- Last vehicle shipped to VTA.

Plant Tour (if Meeting at OEM's Location)

VTA will review the entire process from start to finish and review the work completed at each line station, including quality control measures.

Vehicle Production

The Contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to VTA. 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 VTA. 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 VTA's discretion to ensure that the completed buses have attained the required quality and have met the requirements in "Section 6: Technical Specifications." VTA 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.

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 VTA. 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

VTA 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 VTA'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 VTA. 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. VTA 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.

Vehicle Acceptance

In order to assess the Contractor's compliance with the Technical Specifications, VTA 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 that may be included in the Configuration and Performance Review include, at a minimum, 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
- Gradability test
- Kneeling system function
- HVAC pull down/heat
- Speedometer
- Outside air infiltration (smoke)
- Wheelchair ramps
- Drive system performance qualification

This test shall be jointly conducted by the Contractor and the drive system manufacturer (including but not limited to charge air cooler performance, air to boil test, loss of coolant, electrical inputs and drive system protection system).

- Electric Drive performance qualifications

This test shall be jointly conducted by the Contractor and the Electric drive manufacturer (including but not limited to retarder operation, heat exchanger, interface with ABS and electrical inputs).

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 onsite resident inspectors are to 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.

> **NOTE:** If there is not a pilot/prototype bus, then the Buy America post-delivery audit should be performed following completion of the first serial production bus. In addition to monitoring of the production processes, VTA must verify compliance with Buy America regulations. Finally, VTA must execute the required certificates.

Resident Inspection Process for Serial Production

At the discretion of VTA, a decision is made to perform resident inspection using VTA'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.

> **NOTE:** The decision to have the resident inspection performed by Agency personnel results in a firm understanding and knowledge of the bus and affords the opportunity to identify parts that will be needed for general maintenance down the road.

Inspector Responsibilities

The resident inspection process for the serial production of the buses begins following the completion and acceptance of the prototype or pilot vehicle if required, or according to the serial bus production schedule. Resident inspectors should represent VTA for all build-related issues (quality, conformance, etc.).Resident inspectors can also address contractual type issues but should only do so under the consult of VTA's contracts administrator. Resident inspectors are sent to the manufacturer's facility according to a Resident Inspection

Schedule. Typically, one or two inspectors arrive onsite at the manufacturing facility about one week prior to actual production to setup the resident inspection process and to begin preliminary quality assurance inspections for items such as power plant build-up and wire harness production, and to inspect incoming parts, fasteners, fluids, etc., that will be used in the production of the buses. During the serial production of the buses, the resident inspectors should monitor the production of each bus, verifying the quality of materials, components, sub-assemblies and manufacturing standards. In addition, the configuration of each vehicle should be audited using the vehicle manufacturer's Build Specification and other documents to ensure contract compliance and uniformity.

Inspector Rotation/Scheduling

During the resident inspection phase, a single inspector or multiple inspectors could be used. If it is decided to use multiple inspectors, then the inspectors could be rotated on a biweekly to monthly basis as required. During the rotation of inspectors, a sufficient period of overlap should be provided to guarantee the consistency of the resident inspection process.

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 should 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 eritical 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.

These are the typical inspeetions performed on each bus by the resident inspectors:

- 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 close-outs 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
- Gradability 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 power plant and HVAC compartments are also inspected during this time.

Exterior/Roof 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. Ladders and acceptable safety equipment provided to allow inspection of roof mounted components.

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 VTA 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 VTA'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 typically 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
Gradability 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 VTA'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

VTA shall conduct acceptance tests on each delivered bus. These tests shall be completed in accord with section GC 4.1 and SP 1.5. The purpose of these tests is to identify defects that have become apparent between the time of bus release and delivery to VTA. 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. VTA shall record details of all defects on the appropriate test forms and shall notify the Contractor of acceptance or non-acceptance . 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. VTA 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, VTA 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).

References

SAE #	Title	Date Published
J10	Methods of Test for Paints - Part J10: Determination of Deposition Efficiency of Coating Powders	Sep 15, 1998
J211	Instrumentation for Impact Test—Part 2: Photographic Instrumentation	May 1, 2001
J287	Driver Hand Control Reach	Feb 1, 2007
J366	Exterior Sound Level for Heavy Trucks and Buses	Feb 1, 1987
J382	Windshield Defrosting Systems Performance Requirements - Trucks, Buses, and Multipurpose Vehicles.	Jan 1, 1994
J534	Lubrication Fittings	May 1, 2008
J537	Storage Batteries	Sep 1, 2000
J541	Voltage Drop for Starting Motor Circuits	Oct 1, 1996
J587	License Plate Illumination Devices (Rear Registration Plate Illumination Devices)	Sep 1, 2003
J593	Backup Lamps (Reversing Lamps)	Sep 1, 2005
J673	Automotive Safety Glasses	Oct 1, 2005
J680	Location and Operation of Instruments and Controls in Motor Truck Cabs, Recommended Practice	Sep 1, 1988
J686	Motor Vehicle License Plates	Oct 1, 1999
J689	Curbstone Clearance, Approach, Departure, and Ramp Breakover Angles---Passenger Car and Light Truck	Aug 1, 2009
J833	Human Physical Dimensions	May 1, 2003
J844	Nonmetallic Air Brake System Tubing	Nov 1, 2004
J941	Motor Vehicle Drivers' Eye Locations	Mar 1, 2010
J994	Alarm—Backup—Electric Laboratory Performance Testing	Mar 1, 2009
J1050	Describing and Measuring the Driver's Field of View	Jan 1, 2003
J1113	Electromagnetic Compatibility Component Test Procedure Part 42, Conducted Transient Emissions	Oct 1, 2006
J1127	Low Voltage Battery Cable	Mar 1, 2010
J1128	Low Voltage Primary Cable	Dec 1, 2005
J1149	Metallic Air Brake System Tubing and Pipe	Aug 1, 2007
J1292	Automobile and Motor Coach Wiring	Jan 1, 2008
J1455	Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications	Jun 1, 2006
J1587	Joint SAE/TMC Electronic Data Interchange between Microcomputer Systems in Heavy-Duty Vehicle Applications, Recommended Practice	Jan 1, 1996
J1708	Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications	Oct 1, 2008
J1986	Balance Weight and Rim Flange Design Specifications, Test Procedures, and Performance Recommendations	Jan 1, 2006
J1939	Data Link Layer	Dec 1, 2006
J1995	Engine Power Test Code - Spark Ignition and Compression Ignition - Gross Power Rating, Standard;	Jun 1, 1990
J2402	Road Vehicles—Symbols for Controls, Indicators, and Tell-tales	Jan 1, 2010
J2711	Recommended Practice for Measuring Fuel Economy and Emissions of Hybrid-Electric and Conventional Heavy-Duty Vehicles	Sept 1, 2002

Abbreviation and Acronyms

A/C	air conditioning
ABS	anti-lock braking system
AC	alternating current
ACQ	alkaline copper quaternary
ADA	Americans with Disabilities Act
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
CGA	Compressed Gas Association
CNG	compressed natural gas
dB	decibel
DBE	disadvantaged business enterprise
DC	direct current
DDU	driver display unit
DEF	diesel exhaust fluid
DOT	Department of Transportation
DPF	diesel particulate filter
ECM	Engine Control and Monitoring
ECS	emission control system
ELR	emergency locking retractor
EMI	electromagnetic interference
EPA	Environmental Protection Agency
ESS	energy storage system
FEA	Finite Element Analysis
FEMA	failure mode effects analysis
FMCSA	Federal Motor Carrier Safety Administration
FMCSR	Federal Motor Carrier Safety Regulations
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
ISO	International Standards Organization
LEL	LED emergency light
LV	low voltage
mA	milliampere
MDT	mobile data terminal
MPa	mega-Pascal
NC	normally closed
NFPA	National Fire Protection Association
NGV	natural gas vehicle
NOx	nitrogen oxide
NO	normally open
NTP	notice to proceed
OEM	original equipment manufacturer
OSI	Open Systems Interconnect
PA	public address
PMO	project management oversight
PPU	primary propulsion unit
PPU	prime power init
PPV	price per vehicle
PRD	pressure relief device
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 change
UL	Underwriters Laboratories
UNECE	United Nations Economic Commission for Europe
VDC	volts of direct current
Wh	watt-hours
VIN	vehicle information number

EXHIBIT 6

(i) RFP ADDENDA 1-3,
(ii) QUESTIONS & ANSWERS,
REQUEST FOR PRE-OFFER CHANGE, AND REQUEST FOR PROPOSAL DEVIATION OR APPROVED EQUAL

SANTA CLARA
Valley Transportation Authority

November 29, 2016

To: Proposer

From: Keisha Carnahan, Sr. Contracts Administrator

Subject: **Addendum No. 1 to RFP No. P16265**
40' Full Battery Electric Transit Buses

Certain revisions, additions, and modifications are hereby incorporated into the Request for Proposal (RFP) solicitation documents.

The Change is as follows:

1) **VTA has extended the Proposal Due Date in section NR 3 of the solicitation from 2:00 PM, Wednesday, November 30, 2016 to 2:00 PM, Friday, December 9, 2016.**

SANTA CLARA
Valley Transportation Authority

December 7, 2016

To: Proposer

From: Keisha Carnahan, Sr. Contracts Administrator

Subject: Addendum No. 2 to RFP No. P16265
40' Full Battery Electric Transit Buses

Certain revisions, additions, and modifications are hereby incorporated into the Request for Proposal (RFP) solicitation documents.

The Change is as follows:

1) **VTA has extended the Proposal Due Date per Addendum No. 1 of the solicitation from 2:00 PM, Friday, December 9, 2016 to 2:00 PM, Monday, December 12, 2016.**

Santa Clara Valley Transportation Authority

Solutions that move you

September 7, 2017

To: **Proposer**

From: **Keisha Carnahan, Sr. Contracts Administrator**

Subject: **Addendum No. 3 to RFP No. P16265**
40' Full Battery Electric Transit Buses

Certain revisions, additions, and modifications are hereby incorporated into the Request for Proposal (RFP) solicitation documents.

The Change is as follows:

1) **Delete:**
SP 1.5 Post-Delivery Tests
VTA will conduct acceptance tests on each delivered bus. These tests shall be completed within Twenty (20) 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 VTA. 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. VTA 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.

"Post-Delivery Tests" shall include final testing and commission of the provided electric bus chargers. The chargers will be approved as a group. They will be tested with each bus as delivered in the order before final approval is issued. As the 1st charger is expected before the arrival of the pilot bus the 1st charger will be in service for several weeks before VTA will be able to issue final acceptance. VTA considers this a extend break in period, and as a part of the acceptance process expects the charger to function without issue during this period.

Add:
SP 1.5 Post-Delivery Tests
VTA will conduct acceptance tests on each delivered bus. These tests shall be completed within Twenty (20) 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 VTA. 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).

If completion of the charger portion of the project is delayed, regardless of the responsible party, but VTA otherwise finds the buses themselves acceptable, a retention of 10% of the total contract price for the buses may be applied until the chargers are installed and fully functional in accordance with TS 18 et seq.

Buses that fail to pass the post-delivery tests are subject to non-acceptance. VTA 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.

"Post-Delivery Tests" shall include final testing and commission of the provided electric bus chargers. The chargers will be approved as a group. They will be tested with each bus as delivered in the order before final approval is issued. As the 1st charger is expected before the arrival of the pilot bus the 1st charger will be in service for several weeks before VTA will be able to issue final acceptance. VTA considers this a extend break in period, and as a part of the acceptance process expects the charger to function without issue during this period.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on November 21, 2016.

VTA RFP P16265 40' Full Battery Electric Transit Buses

Request #: 001

Proposer: Proterra Inc
RFP Section: Key RFP Dates
Page: 1

Questions/clarification or approved equal:

Please extend the proposal due date to December 9, 2016 to allow additional time to finalize our proposal documentation. While most of the documentation is already prepared, we are still working through the technical changes and pricing approvals for many of the recent changes we agreed to make in our deviations response on RFP P16265.

Agency action:

X Approved ☐ Denied ☐ Request More Info / Clarification

X See addendum ☐ See response below

Agency response:

11/29/16 - VTA will extend the proposal for RFP#P16265 until 2:00 PM PT on Friday, December 9, 2016. VTA will forward the Addendum#1 to Proterra.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on November 21, 2016.

VTA RFP P16265 40' Full Battery Electric Transit Buses

Request #: 002 Proposer: Proterra Inc RFP Section: IP 3 Page: 18
Questions/clarification or approved equal: Proterra respectfully requests the deletion of the performance bond requirement in Section IP 3 of the RFP. As partners in this Low-No grant, Proterra is respectfully requesting that the bonding requirements are removed for this RFP. As a young company, the surety company we work with asks for collateral in the form of cash which can negatively affect our ability to remain flexible with our assets. Additionally, Under FTA Circular 4220.1F, Chapter VI, Section 2.a.(4), "FTA discourages unnecessary bonding because it increases the cost of the contract and restricts competition...". Further, Appendix D to FTA Circular 4220.1F indicates that bonding is not required for rolling stock purchases (Ref: Appendix D-5). However, if VTA still believes that bonding is desirable, FTA suggests the bonding requirements should be "reasonable and not unduly restrictive". As such, we would respectfully ask VTA to consider only a performance bond through the delivery and acceptance of the buses and not a second bond for the warranty period.
Agency action: □ Approved □ Denied □ Request More Info / Clarification □ See addendum X See response below
Agency response: 11/29/16 - VTA requires additional time to assess the scope of this request. 12/5/16-VTA requests that Proterra break down each of the bonding costs on their Price Proposal submission. VTA will review the associated costs and plan to discuss with Proterra during negotiations. 7/17/17-VTA has agreed to a 2 year warranty bond from the date and acceptance of each bus, with the understanding that all other bonding requirements and liquidated damages hold per the RFP#P16265 solicitation requirements. Note that VTA agreed to have the liquidated damages go into effect if Proterra missed the new bus schedule that is included in this Contract.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on November 21, 2016.

VTA RFP P16265 40' Full Battery Electric Transit Buses

Request #: 003 Proposer: Proterra Inc RFP Section: SP 1.2 Pilot Bus Page: 59			
Questions/clarification or approved equal: If VTA requires a Pilot Bus as described in SP 1.2, Proterra respectfully requests that the Pilot Bus delivery date be extended until December 2017 (10 months from planned VTA Board Approval date) along with a shorter (60 or 90 day) time period for evaluation before starting to build the remaining buses.			
Agency action:	☐ Approved	X Denied	☐ Request More Info / Clarification
	☐ See addendum	X See response below	
Agency response: 11/29/16 - VTA requires a minimum of 90 days between the pilot bus delivery and the 2nd bus of the fleet to evaluate the provided vehicle and request any additional fleet changes. VTA requires the complete delivery of this fleet by the end of 2017. As such the pilot bus must be delivered no later than mid-September 2017. 7/17/17-VTA has agreed to forgo the Pilot Bus in lieu of a Custom Demo Bus to include highly configurable items (flooring, seats, and bus wrap) for approximately 3 months (from 10/31/17-1/29/18) or until the first VTA bus is delivered at no charge to VTA. VTA has updated the bus delivery schedule to reflect Proterra's worst case scenario, which has the five buses delivered to VTA in the following order: Bus 1 - 1/29/18, Bus 2 - 2/5/18, Bus 3 - 2/12/18, Bus 4 - 2/19/18, and Bus 5 – 2/26/18.			

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on November 21, 2016.

VTA RFP P16265 40' Full Battery Electric Transit Buses

Request #: 004 Proposer: Proterra Inc RFP Section: TS 18 Charging Stations Page:126
Questions/clarification or approved equal: Will VTA allow Proterra and employees from ChargePoint and a potential installation partner participate in a site visit at the VTA depot where the charging island will be installed to further understand VTA's charging plans? If so, please allow for the site visit the week of November 28th.
Agency action: X Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum ☐ See response below
Agency response: 11/29/16 - VTA will allow for a site visit; however, VTA is currently working with an Engineering Design Firm to design the charging infrastructure. Please contact Keisha Carnahan (408)321-7194 to arrange for a site visit.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 001

Proposer: Proterra Inc
RFP Section: NR1
Page: 18

Questions/clarification or approved equal:

Please elaborate on the plans for charging the pilot bus. Will the Contractor be responsible for delivering a single plug-in charger ahead of the pilot bus delivery? Will he Contractor have any responsibility for the installation of the plug-in charger?

Agency action: □ Approved □ Denied □ Request More Info / Clarification □ See addendum X See response below

Agency response:
The Contractor is expected to provide 5 depot plug-in style chargers. 1 charger is expected before the delivery of the pilot bus. The remaining balance of chargers is expected prior to the delivery of the 2nd bus. VTA will have a third party contractor to provide the electrical connection, and mechanical mounting for the chargers. The Bus Contractor (Proposer for this RFP) is expected to perform the final installation and validation of the chargers, as well as provide technical support and recommendations for the charger station design.

7/17/17 – VTA for RFP#P16265, VTA requests that the Custom Demo Bus Charger is delivered 15 days prior to the October 31, 2017 Custom Demo Bus Delivery Date. VTA requests that the chargers for the Bus Order be delivered by the end of the November 2017.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 002 Proposer: Proterra Inc RFP Section: IP 4 Page: 20
Questions/clarification or approved equal: Proterra respectfully requests the deletion of the performance bond requirement in Section IP 4 of the RFP. Under FTA Circular 4220.1F, Chapter VI, Section 2.a.(4), "FTA discourages unnecessary bonding because it increases the cost of the contract and restricts competition...". Further, Appendix D to FTA Circular 4220.1F indicates that bonding is not required for rolling stock purchases (Ref: Appendix D-5). However, if VTA still believes that bonding is desirable, FTA suggests the bonding requirements should be "reasonable and not unduly restrictive". As such, we would respectfully ask VTA to consider only a performance bond through the delivery and acceptance of the buses and not a second bond for the warranty period.
Agency action: ☐ Approved X Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: Proposers unable to meet all of the requirements of the RFP will still be considered, but will be assessed a scoring penalty during the proposal evaluation process. Please note that all deviations must still be submitted with the proposal, including this one. It is VTA's expectation that all bonds requested in the RPF will be provided. **7/17/17-VTA** for RFP#P16265-- See RFP #P16265 CER 3. Request for Pre-Offer Change, Request #2 for VTA's final response.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 003 Proposer: Proterra Inc RFP Section: IP 13.5 Page: 42
Questions/clarification or approved equal: Please clarify what percentage each of the four primary evaluation criteria (technical, management plans, past performance, and price) have relative to the total scoring of the proposals.
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: VTA has listed the evaluation criteria by their relative degree of importance in Section IP 13.5, as follows: *Technical (Technical Approach, System Integration, Quality Assurance, and System Support) *Management Plans *Past Performance *Price VTA is not providing percentage weights for each criteria. VTA is using a narrative scoring system, as detailed in Section IP 13.7 of the Request for Proposal and shown below: *Unacceptable *Marginal (Can probably be made acceptable) *Acceptable *Exceptional

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 004 Proposer: Proterra Inc RFP Section: GC 4.1 Page: 50
Questions/clarification or approved equal: Please make sure to reference the chargers in the contract in order to successfully identify the inspection and acceptance procedures for them too. Currently only the buses are included in the RFP language covering inspection & acceptance.
Agency action: □ Approved □ Denied □ Request More Info / Clarification X See addendum X See response below
Agency response: Noted, topic will be addressed with an addendum. 7/17/17-VTA, Note that each Charger will be accepted as an individual unit and each bus will be accepted as an individual unit.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 005 Proposer: Proterra Inc RFP Section: GC 7.1 Page: 51
Questions/clarification or approved equal: The requirement to flow-down this clause to subcontractors is understandable and acceptable as subcontractors are selected for specific projects / builds. For supply orders, the large majority of them are issued for standard bus items and they are not always purchased on a per customer basis. Therefore we respectfully request the deletion of the reference to "supply orders" in this clause.
Agency action: □ Approved □ Denied □ Request More Info / Clarification X See addendum X See response below
Agency response: VTA expects that this clause will flow down to all major components (pumps, motors, doors, signs, etc.). VTA also understands that it is not reasonable to apply it to bulk goods; such as, fasteners. VTA will amend the contract language to make this clarification.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 006

Proposer: Proterra Inc
RFP Section: SP 6
Page: 69

Questions/clarification or approved equal:

We respectfully requests the deletion of the Liquidated Damages provision. If VTA is unwilling to remove them altogether, we would request that VTA reduce the value of the Liquidated Damages to $100/day, thus eliminating the current concept of the "greater of" two options. Additionally we'd like to see the Liquidated Damages capped at ten percent of the price of the item so delayed.

If VTA insists the clause remain as is, please clarify what is intended by the greater of the two liquidated damages options outlined in the RFP.

Agency action:	□ Approved	X Denied	□ Request More Info / Clarification
	□ See addendum	X See response below	

Agency response:
Proposers unable to meet all of the requirements of the RFP will still be considered, but will be assessed a scoring penalty during the proposal evaluation process. Please note that all deviations must still be submitted with the proposal, including this one.

VTA has a minimum per day liquidated damages cost, $1,000. Should multiple buses be effected over multiple days that amount would not be enough to cover VTA's loss, as such it is set at $200 per bus, per day.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 007 Proposer: Proterra Inc RFP Section: SP 7.2 Page: 70
Questions/clarification or approved equal: The amount of printed manuals seems excessive for a 5 bus base order. Can you please review and confirm if the printed copies are required in such large numbers?
Agency action: □ Approved □ Denied □ Request More Info / Clarification X See addendum X See response below
Agency response: Noted, amount will be reduced with an addendum.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 008 Proposer: Proterra Inc RFP Section: SP 9 Page:			
Questions/clarification or approved equal: The insurance coverage amounts seem high for this effort. We would be much more comfortable with a $5M requirement.			
Agency action:	☐ Approved	X Denied	☐ Request More Info / Clarification
	☐ See addendum	X See response below	
Agency response: Proposers unable to meet all of the requirements of the RFP will still be considered, but will be assessed a scoring penalty during the proposal evaluation process. Please note that all deviations must still be submitted with the proposal, including this one. It is VTA's expectation that all insurance requirements in the RPF will be met.			

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 009 Proposer: Proterra Inc RFP Section: TS 5.6 Page: 95			
Questions/clarification or approved equal: Request clarification on number for training hours desired. There is a contradiction in the "technical orientation" initial paragraph. Initially it says all three VTA facilities will need to be trained and then it says only one will need to be trained.			
Agency action:	□ Approved X See addendum	□ Denied X See response below	□ Request More Info / Clarification
Agency response: Noted, will be corrected via addendum.			

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 010 Proposer: Proterra Inc RFP Section: TS 7.4 Page: 112
Questions/clarification or approved equal: With respect to the requirement to operate 120 miles "or 20 hours", can you please clarify exactly what the Contractor's should assume relative to the 20 hour requirement? Will the bus finish driving the 120 miles and then sit there in the ON position in order to ensure the parasitic loads don't drain the battery over the 20 hours? Or is the requirement that the bus stays on route for 20 hours which may equate to greater than 20 hours.
Agency action: □ Approved □ Denied □ Request More Info / Clarification □ See addendum X See response below
Agency response: It is VTA's expectation that the bus will operator for a minimum of 120 miles with a maximum in-service/on time for that 120 miles of 20 hours. For example if the bus average speed is 20 MPH, the bus would be operating for 6 hours, and sitting idle for 14 hours. It can be assumed that the idle time would be with the HVAC system off, drive time however would have the HVAC on at full load.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 011 Proposer: Proterra Inc RFP Section: TS 9.3.4 Page: 116			
Questions/clarification or approved equal: Please provide additional details behind the assumptions used to calculate 400,000 miles based on 7 years in service (i.e. annual miles / bus + daily mileage / bus).			
Agency action:	☐ Approved X See addendum	☐ Denied X See response below	☐ Request More Info / Clarification
Agency response: Many VTA hybrid busses operate 50,000 miles per year. VTA expects the total mileage to be a maximum of 350,000 not 400,000 over 7 years. This will be corrected via an addendum.			

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 012

Proposer: Proterra Inc
RFP Section: TS 17.3
Page: 126

Questions/clarification or approved equal:

All charging systems listed in this section must meet all applicable recommendations from SAE J1773. We suggest more generic language like "... must meet applicable recommendations from appropriate SAE standards." Or, alternatively VTA could even list some of the SAE standards J1772, J3068, J1773. For reference SAE J1773 is explicitly about inductively coupled charging.

We suggest the removal of the statement "Should specific SAE specifications for transit bus charging, such as J3068 be released before vehicle delivery..." SAE J3068 is not a transit bus standard; it's just a standard that could be applied to buses. Another such standard is SAE J1772 CCS which has already been released.

Regarding the statement "Although not required, VTA expects that all necessary power electronics to convert AC charging input to DC current for ESS charging will be provided onboard the bus", can you please elaborate why VTA prefers this approach over DC charging?

Regarding the preference for "plug-in style" charging systems that can safely recharge the bus ESS from 20% SOC to 100% in less than 4 hours, this requirement may actually penalize solutions that contain the largest amount of on-board energy storage (and therefore the longest range per single full charger) based on currently available commercial EV chargers that meet the released SAE standards.

Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification
X See addendum X See response below

Agency response:
J1773 is still applicable as VTA is requesting that suppliers provide compatibility with in route inductive fast chargers. J1772 & J3068 will be added to the heading via addendum.

VTA expects J3068 to be applied to the transit bus market.

Though not required, AC charging simplifies charging station requirements.

Meeting the specifications in J1772 CCS should allow for charging at a rate of 90 kW. Over a 4 hour charge cycle that should provide a 360 kW/hr. charge. VTA expects the total battery capacity for a 40' bus to be 350 kW/hr. or less in order to meet the range requirements. Of that only about 280 kW/hr. will be usable. Therefore chargers meeting the SAE specifications will meet this requirement. Should an offer have energy capacity beyond 350 kW/hr. VTA is open to discussing alterations in the charging times and capacities.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 013 Proposer: Proterra Inc RFP Section: TS 17.3.1 Page: 126			
Questions/clarification or approved equal: Can the "system" include multiple ports to support 100kW? Currently available J1772 CCS and CHAdeMO plug-in chargers top out at 50kW, although future products are expected to reach 100kW or beyond.			
Agency action:	X Approved X See addendum	□ Denied X See response below	□ Request More Info / Clarification
Agency response: Multiple ports are acceptable. Please note that J1772 CCS can support up to 90 kW, which as previously noted should be enough to meet the changing requirements of the RFP with one connection. Preference will be given to chargers that can meet the requirement with a single connection/port.			

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 014

Proposer: Proterra Inc
RFP Section: TS 17.3.2
Page: 127

Questions/clarification or approved equal:

There is a standard group out of SAE (delegated by APTA) to pull together a bus-specific on-route charging system standard. This standard is SAE J3105. The current direction of the standard organization has focused on systems that have the connection system mounted off board the vehicle and lower to contact the vehicle. There are light rail systems that use a catenary that is a conductive member that rises from the train. There was solution for buses implemented in a similar fashion, but I understand that approach to be abandoned for future work. If this request is specifically about having a catenary system raise from the vehicle, VTA has a perspective contrary to the current consensus of the standard organization and it would be good to understand the reasoning. Just trying to understand the expectation around this.

Once the operator reaches at most 15 ft from having the charging connection aligned the bus shall enter an autopilot mode which will require no driver input to complete the charging connection. - Would a system that required the operator to still press the accelerator pedal to move forward, but limit the speed and stop the bus in the right location be acceptable? Also is it expected that the operator have any specific alignment tolerance before the docking process? Would lateral alignment of +/-12 inches be OK?

Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below

Agency response:
Proposals for both systems that raise from the bus, and lower from an off board connection will be considered. Please note that VTA does not require or expect the vehicle to come equipped with such a system. VTA is only looking for compatibility with such a system, and the proposer's system suggestion.

The intention of the "self-driving" feature of the docking procedure is to eliminate the requirements that the operator lines the bus up. It is VTA's expectation that the bus can operator in an autonomous fashion during the charge docking procedure. The operator must still be present, and have easy over ride features, but should not have to provide any vehicle input once the procedure has started. As such there should be no docking tolerance/alignment concerns, other than approaching the bus stall and engaging the autonomous docking feature.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 015

Proposer: Proterra Inc
RFP Section: TS 17.3.3
Page: 127

Questions/clarification or approved equal:

We recognize the requirement to quote the pricing for an inductive charging system, but is the requirement to pre-wire and provide mounting points for hardware exist for the base vehicles, regardless of whether the option is ever utilized? The mounting points under the vehicle where the high voltage batteries are located; so including them would drive up vehicle cost perhaps for no reason if wireless inductive charging is never utilized.

Regarding the requirement to inductive charge at 150kW, we are unaware of any inductive systems developed and in use at that high of a charge rate. We may be able to provide a quote, but there's technological risk associated with this approach as nothing has been successfully deployed in revenue service yet.

Current auto docking relies on our system. The WAVE / inductive systems would be totally separate and we do not know of any auto-docking process associated with inductive charging. Please clarify if this is a requirement to be implemented when the initial buses are delivered?

Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below

Agency response:
VTA understands there will be some additional costs associated with pre-wiring and providing mounting locations for systems that may or may not be installed. However it is VTA's expectation and intention to deploy en route charging shortly. By providing the necessary wiring and hard points an overall cost savings will be achieved to VTA when the time comes to retro-fit the en route chargers.

It is VTA's understanding that AVTA has received competing offers for inductive charging systems rated at or above 150 kW. Should a supplier be unable to source inductive chargers at 150 kW, they are expected to offer the next most powerful system. Note that the electrical components provided with the vehicle are expected to support 150kW inductive charging.

The RFP calls for autonomous auto-dock style features for both types of en route charging.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 016 Proposer: Proterra Inc RFP Section: TS 18.1 Page: 128
Questions/clarification or approved equal: VTA will provide the proposers with five individual 480V 3-phase electrical connections each capable of supporting up to 100 kW. Would VTA install more than 100kW service if charger was capable of more than 100kW? This statement, combined with the statement in TS 18, drive the chargers to be exactly 100kW.
Agency action: □ Approved □ Denied □ Request More Info / Clarification □ See addendum X See response below
Agency response: VTA's current plan is to provide 5 power connections capable of supporting 100 kW each. This is the maximum power that is available at the facility, and VTA is not interested in expanding the backend power infrastructure at this time. As previously noted 80-100 kW rated chargers are expected to be enough to meet the charging needs. VTA will look favorably upon buses that can accept multiple charger connections to allow for charging above 100 kW if needed.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 017 Proposer: Proterra Inc RFP Section: TS 18.2 Page: 129
Questions/clarification or approved equal: If vendor is not responsible for installation of the chargers, how are we supposed to ensure that all charging stations must be commissioned and operational within 30 days of delivery of the first bus?
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification X See addendum X See response below
Agency response: Noted, the vendor providing the buses is expected to complete the final installation and validation of the chargers. See addendum for updates to the RPF.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 018 Proposer: Proterra Inc RFP Section: TS 18.2.1 Page: 129
Questions/clarification or approved equal: No post-delivery test shall apply new criteria that are different from criteria applied in a pre-delivery test. What are pre-delivery criteria? Need to understand the criteria for acceptance. Are these just the requirements, or is there a checklist, or do we propose a checklist?
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification X See addendum X See response below
Agency response: Noted, will be removed via an addendum. There is no checklist currently available. It is expected to be developed during the pre-production with the successful proposer. It is expected that the chargers work properly, communicate with the vehicle, and transmit charging data requested in the RFP.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 019

Proposer: Proterra Inc
RFP Section: TS 18.3
Page: 130

Questions/clarification or approved equal:

Wireless communication system. Would a wired system be OK if it was installed in an area with wiring available? Wireless communications will incur a monthly bill to maintain that connection. Often bus yards have networks at them, so the charger could be tied to the network. In general, reliability and robustness are key and wired is more reliable and robust than wireless, so it's the first choice, if available.

Additionally preference will be given to systems that can automatically output this data and integrate it into VTA's SAP system. Can we get some information on the Application Program Interface (API) to interface with this system?

Agency action: □ Approved □ Denied □ Request More Info / Clarification □ See addendum X See response below

Agency response:
Wired communication is approved, and wired telecommunication connections will be provide at the charger locations per the vendor's request.

Currently VTA's SAP system pulls plain text files with data from other vendor's FTP servers. Such a method would be acceptable for critical bus data; such as, mileage and energy consumption. Further details about file formatting will be discussed post bid award.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 020 Proposer: Proterra Inc RFP Section: TS 18.3.1 Page: 130
Questions/clarification or approved equal: Preference will be given to charging ports that comply with the CHAdeMo or SAE J1772 quick charging connector standard. Preference will also be given to other connection types that are documented in other electric vehicle engineering standards such as SAE J3068. SAE J3068 is not a bus standard. It's just a standard that could be applied to buses. Another such standard is SAE J1772 CCS. SAE J1772 CCS has already been released. Is the Contractor to provide the 4 bollards for the installation, or would that come from the vendor selected for the installation of the charge stations? Same question applies for the lighting. It doesn't seem to make sense for the Contractor to provide that equipment. VTA expects the system to at a minimum be able to charge at 100 kW. Does "system" mean one plug, or one vehicle? Can two plugs/two smaller chargers be used to meet 100kW requirement? Current SAE and CHAdeMO chargers support up to about 50kW. Changes to these standards will allow much higher power, but these chargers are not on the market yet. The island is expected to contain all necessary charging equipment and electrical cabinets to recharge 4 buses. 5 Chargers are mentioned in TS 18 of the RFP. Is the 5th charger a non-installed spare? Looking to understand where the 5th charger goes. Also, how big is the island for charge equipment? Need to understand width and length. VTA will provide the proposed island with a 3 phase 230/400V connection to its existing nearby electrical infrastructure. Specific details of connection types and power are available upon request. Is this really limited to 230/400VAC, or do we have 480VAC available? We would also like some more detail on power available to quote equipment properly. A sketch of the site would be helpful as well to understand about expandability capability. The depot chargers shall be capable of discharging the on-board energy storage system to facilitate making repairs. Would using on-vehicle means of discharge be acceptable? We are not aware of standard chargers available today that currently support bi-directional power flow. There are some proprietary solutions, but we need to understand if this reverse power capability is more important or if standardization is more important.
Agency action: X Approved ☐ Denied ☐ Request More Info / Clarification X See addendum X See response below

Agency response:
SAE J1772 CCS is acceptable, as is J3068 which VTA expects to be applied to transit buses.

This section provides a description of the charging station that will be provided for the chargers. Bollards, island, lights, communications lines, trenching, power connections etc. are not expected to be provided by the bus RFP proposer. The chargers, and specialty charging equipment beyond the 3-phase power connections that VTA will provide via a third party contractor are required.

Charger information will be updated to a minimum of 50 kW. As noted earlier SAE J1772 CCS can support up to 90 kW.

The section will be corrected to say 5 buses not 4 buses through an addendum.

480 V can be made available, the 100kW per line power limit will remain the same. VTA is currently in the design and review process for needed internal electrical infrastructure improvements. VTA expects the winning bidder to work with VTA and a 3rd party contractor to finalize the electrical power infrastructure for the charging station. VTA will provide a power distribution panel capable of providing 10 lines of 100kW; however, for the 1st phase of the electric bus project only 5 of those 10 lines will be utilized. The remaining 5 will be reserved for future fleet expansion.

On vehicle methods of power discharging are an acceptable alternative to providing backing feeding bus chargers.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 021

Proposer: Proterra Inc
RFP Section: TS 18.3.2
Page: 131

Questions/clarification or approved equal:

The first sentence mentions both inductive and conductive, please delete the reference to inductive.

The chargers shall be capable of being controlled and scheduled by a centralized charger management system that allows a user to control charging start and stop times, charging SOC, etc. for each charger on the system. We would like to understand the intent behind this some more. With on-route charging, the system automatically charges the bus to what it needs to complete route and the operator can cancel charge at any point. This control feature to allow adjustment of termination doesn't seem like it adds value in that context.

On route charging is opportunity based charging as part of the schedule. Trying to understand control intent here.

Agency action:	□ Approved	□ Denied	□ Request More Info / Clarification
	X See addendum	X See response below	

Agency response:
Noted, will be corrected via an addendum

VTA is aware of the challenges that other agencies face with peak demand charges when charging buses en route during the day. VTA understands that some en route charging systems have had their charging peak power adjusted in order to reduce peak demand electrical rate. Having the flexibility to throttle the charging rate as needed will allow VTA to control peak power spikes, and is a feature that VTA has a high level of interest in.

CER 3. Request for Pre-Offer Change

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VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 022 Proposer: Proterra Inc RFP Section: TS 18.3.3 Page: 131
Questions/clarification or approved equal: This section appears to be a copy and paste of 18.3.2 with only the reference to WAVE IPT being changed. Can you clarify what the requirements are for this section? Also – regarding the requirement for the minimum power of 150kW, to our knowledge no inductive chargers above 50kW have been successfully installed or used in revenue service.
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: VTA expects that both inductive and conductive charging systems to be quoted. VTA recognizes that to date no inductive system capable of more than 50 kW have been put into regular transit service. VTA also understands that 150kW inductive systems are available.

CER 3. Request for Pre-Offer Change

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VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 023 Proposer: Proterra Inc RFP Section: TS 38.2 Page: 147
Questions/clarification or approved equal: The referenced Air Compressor is not an oil-less air compressor. Please provide the correct oil-less compressor.
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: The compressor listed is not oil-less. It's listed as performance reference for durability, and performance. VTA does not expect any vender to provide that specific air compressor. VTA expects the vendor to select an appropriate compressor that meets all of the requirements of the RFP, including matching durability and performance to compressor mentioned.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 024 Proposer: Proterra Inc RFP Section: TS 41.3 Page: 154
Questions/clarification or approved equal: All electrical connections shall have dielectric grease. Should this apply only to electrical connections exterior of the vehicle that are not environmentally protected?
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification X See addendum X See response below
Agency response: This will be clarified via addendum. It is to be applied to exposed electrical connections only.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 025

Proposer: Proterra Inc
RFP Section: TS 43.1
Page: 157

Questions/clarification or approved equal:

A single test button mounted at a panel at the operator's compartment area, upon activation, will provide a system check of the circuits. Can you please provide more information about how this is supposed to function?

Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below

Agency response:
VTA is open to various solutions for this request, and expects each multi-plex vendor to be slightly different. The intent is to provide maintenance personnel an easy to use multi-plex system circuit check. In general bus multi-plex systems have LED indicators for each circuit on the system. When pressed this button would have the system run self-diagnostics and highlight any problem circuits by flashing or holding the appropriate LED indicator.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 026 Proposer: Proterra Inc RFP Section: TS 44.3.1 Page: 159
Questions/clarification or approved equal: We are unsure of the meaning the hexadecimal cross reference. If this pertains to the DBC file used to decode CAN information, we can provide a file for available Proterra information, but we can't provide DBC files for 3rd party networks.
Agency action: X Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: The DBC file will meet the requirement; however, additional communication information about all sub-systems on the vehicle are expected.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 027 Proposer: Proterra Inc RFP Section: TS 52.2 Page: 176
Questions/clarification or approved equal: Are all windows expected to be egress, or do they just need to be capable of egress and the entire configuration need to meet the FMVSS requirements for egress exits for a 40 foot transit bus?
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: All windows need to be capable of it, but only those required by FMVSS should have the feature.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 028 Proposer: Proterra Inc RFP Section: TS 75 Page: 196
Questions/clarification or approved equal: Fare Collection - are the Contractors required to purchase the farebox?
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: Per the RFP a fare box is to be provided.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 029 Proposer: Proterra Inc RFP Section: WR 1.1.10 Page: 226
Questions/clarification or approved equal: Please clarify why the Contractor is responsible for maintaining detailed records of charger maintenance as it appears that the agency will be doing the work.
Agency action: □ Approved □ Denied □ Request More Info / Clarification □ See addendum X See response below
Agency response: VTA will maintain a record of any required normal service/maintenance inspections. Additional repair, and maintenance work done by the contractor must be documented and tracked by the contractor throughout the warranty period. This documentation must be made available to VTA throughout the expected life of the vehicles..

CER 3. Request for Pre-Offer Change

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VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 030 Proposer: Proterra Inc RFP Section: WR 2.2 Page: 228
Questions/clarification or approved equal: The 2-calendar day response time to begin repairs is very tight. We respectfully request a 5 day time period to begin repairs.
Agency action: ☐ Approved X Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: Proposers unable to meet all of the requirements of the RFP will still be considered, but will be assessed a scoring penalty during the proposal evaluation process. Please note that all deviations must still be submitted with the proposal, including this one.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 031 Proposer: Proterra Inc RFP Section: CER 1 Page: 237
Questions/clarification or approved equal: Please articulate exactly what is being quoted for the line item for Flip-up Seats; i.e. should that include the full seating package or just the flip-up seats?
Agency action: ☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: This is for the flip-up seats in the ADA area only.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 032 Proposer: Proterra Inc RFP Section: Appendix A Page: 281
Questions/clarification or approved equal: Please provide clarification on what's expected during the water run-off test.
Agency action: □ Approved □ Denied □ Request More Info / Clarification □ See addendum X See response below
Agency response: The water-run off test is part of the factory bus inspection prior to acceptance. Its primary purpose is to ensure that water doesn't pool in any spaces or compartments on the interior or exterior of the bus.

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 033 Proposer: Proterra Inc RFP Section: Appendix A Page: 282	
Questions/clarification or approved equal: Request clarification on the Electric Drive Performance Qualifications. What, if anything, is specifically being requested?	
Agency action:	☐ Approved ☐ Denied ☐ Request More Info / Clarification ☐ See addendum X See response below
Agency response: The electric drive performance test is part of the factory inspection prior to bus acceptance. It's a basic test drive test to ensure appropriate acceleration, top speed, and per mile energy consumption while maintaining normal operation conditions for all subsystems. This should include electrical and cooling data from the power electronics and ESS. This test is expected to be done at full passenger load.	

CER 3. Request for Pre-Offer Change

This form must be used for requested clarifications and changes, and must be submitted by the Question submittal deadline of 5:00 PM PT on June 27, 2016.

VTA RFP P16130 40' Low Floor Full Battery Electric Transit Buses

Request #: 034 Proposer: Proterra Inc RFP Section: Appendix A Page: 286
Questions/clarification or approved equal: Request clarification on Interior and Exterior noise test requirements. Proterra completed interior and exterior noise tests during engineering testing, but we're not being asked to perform these tests on each production bus, correct?
Agency action: □ Approved □ Denied □ Request More Info / Clarification □ See addendum X See response below
Agency response: The noise testing is not expected for each bus in the production run. However, at the factory inspector's request the noise test may need to be performed should a vehicle display undesirable characteristics.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
1	Proterra Inc	TS 5.6	95

Complete description of Deviation:
Proterra does not offer training course for overhauling its Energy Storage System (ESS).

Rationale "pros and cons" (list any attachments):
Proterra does not offer ESS overhaul training due to the proprietary nature of the lithium-ion battery pack design that Proterra employees. The ESS battery packs are manufactured in Burlingame, CA and any warranty work would either be performed on-site at VTA by Proterra employees or at Proterra's facility in Burlingame, CA.
11/16 – Proterra - Proterra can provide training on the safe removal and re-installation of the Catalyst battery packs. Additionally, Proterra can train VTA's maintenance technicians on how to service the items in the Ancillary Bay of the battery pack (things like current sensors, electronics, etc.). Proterra requires that the Module Bay of the battery pack remain factory sealed as compromising that seal could void the warranty and would expose VTA employees to sensitive Proterra intellectual property that Proterra must protect in order to maintain its industry leading edge in transit battery pack development.
3/10/17 – Proterra hereby agrees to withdraw this deviation for Santa Clara VTA.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 1. VTA - VTA requires training on the service and maintenance of all major powertrain components.
11/29/16 – VTA - Though VTA understands the reasoning behind this request. VTA will treat it as a request only. Once VTA has accepted delivery of the bus it will be free to do as it sees fit to maintain and operate the bus. A scoring penalty will be assessed.
2/28/17-VTA-At the Negotiation Meeting Proterra confirmed that all batteries are serialized, the modules are sealed and shall be off limits for VTA to work on. If a module needs to be replaced, Proterra would prefer to have Proterra service person do it a Proterra factory. Proterra stated that the work should be done in a controlled environment. A scoring penalty will be assessed.
3/15/17 VTA, thank you for adhering to VTA's original specification.
7/17/17 VTA, Proterra agreed to provide Fogmaker Fire Suppression.

PROTERRA

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
2	Proterra Inc	TS 5.11	106

Complete description of Deviation:
Proterra is not quoting a Fire Suppression system

Rationale "pros and cons" (list any attachments):
Battery-electric buses do not require fire suppression systems. When a fire suppression system is installed, nozzle placement is important with nozzles typically being placed in high risk locations; namely the engine, exhaust, and fuel systems. Battery-electric buses do not contain an engine and exhaust systems. The fuel system, or high voltage batteries, are already monitored for heat and abnormal behavior. Additionally, electric buses have a dramatically cooler motor compartment, a reduced amount of flammable fluids, and less wear on the service brakes due to regenerative braking, therefore the risk of a fire is greatly reduced when compared to an internal combustion vehicle.
11/16 – Proterra - Proterra is currently developing a fire suppression system as it remains a common request from our transit agency partners. At this point, the suppression system would focus on suppressing non-ESS fires in areas like the 12/24 battery bay, near service brakes, etc... Proterra's ESS battery packs are designed to control a thermal event by limiting the off-gassing of each cell in order to slow the effects of a thermal event, allowing plenty of time for safely deboarding of the bus. The inclusion of the Fire Suppression system may affect the pricing in a BAFO stage.
3/10/17 – Proterra will provide a Fogmaker fire suppression system in the 12/24 battery bay and electric drive system. The ESS has its own thermal safety protections.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions Request More Info/Clarification
☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 2. VTA - What measure does Proterra have in place in the event of a battery fire? What \testing has been done on the battery cells to ensure their fire safety? What fail safe systems are in place to ensure that the HV power steering system never arches to ignite the hydraulic oil?

12/12/16 - VTA – VTA requires the fire suppression system, and it's been part of the system design from the onset of the RFP. The response is unclear if the system will be provided, as such a scoring penalty has been assessed. Proterra can address pricing through the Negotiation/BAFO stage.

2/28/17-VTA-Proterra confirmed during negotiations that they are currently providing the Amerex fire suppression system, but they will look into providing the Fogmaker fire suppression system and confirm with VTA if they will provide for this bus build.

3/15/17 VTA- Understood and accepted as meeting the intent of the specification

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
3	Proterra Inc	TS 6.1.1	108

Complete description of Deviation:
The rear step height of the Catalyst bus is 17".

Rationale "pros and cons" (list any attachments):
One of the major benefits of the Catalyst vehicle is the placement of the battery packs under the floor and between the wheels (outside of the passenger compartment). The higher step height is a result of the packaging of the batteries under the floor.

11/16 – Proterra - Proterra will work with VTA in order to determine if additional kneeling is available to in order to provide a lower rear step height.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved X Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied X See response below

Agency response:
10/3/16 3. VTA - VTA would like to see the bus kneel 4 inches instead of the required 3 inches in order to make up the step in height. Ideally the kneeling would go to 5 inches, so that the 15 inch step in height can be retained.

12/12/16 - VTA - The step in height is unacceptably high for VTA operation; however, VTA will approve with the condition that Proterra work with VTA on the kneeling height. VTA may assess a scoring penalty.

2/28/17-VTA – VTA's preference is for a lower floor height. VTA may assess a scoring penalty.

PROTERRA

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
4	Proterra Inc	TS 6.3	108

Complete description of Deviation:
The break-over angle of the 40' Catalyst vehicle is 7 degrees.

Rationale "pros and cons" (list any attachments):
The longer wheel base of our vehicle is designed to accommodate the location of the batteries under the bus in order to provide exceptional weight balance and handling (when combined with our independent double A-arm front suspension). Additionally, the Catalyst vehicle has a standard ride height adjustment feature that can lift the vehicle by 2", effectively improving the breakover angle when the ride height is engaged by the operator.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification

☐ See addendum ☐ Denied ☐ See response below

Agency response:

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
5	Proterra Inc	TS 6.5.1	110

Complete description of Deviation:
Floor Height - Our step in height is 16.7" at nominal ride height.

Rationale "pros and cons" (list any attachments):
One of the major benefits of the Proterra Catalyst vehicle is the placement of the battery packs under the floor and between the wheels. Having the batteries located in this location allows for the following benefits:

- Lower center of gravity, better handling
- Increased safety
- No HV batteries inside the passenger compartment
- Batteries are lower than the side impact height for automobiles

However, as a result, the step height and floor height are slightly taller than average vehicles at nominal ride height. The buses are still capable of full kneel functionality.

11/16 – Proterra - This deviation was mistakenly submitted, the front step is 15.5 inches from the ground.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved X Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:

10/3/16 5. VTA - VTA would like to see the bus kneel 4 inches instead of the required 3 inches in order to make up the step in height.

12/12/16 - VTA - 15.5" is better, but still too high; however, VTA will approve with the condition that Proterra works with VTA on the kneeling. VTA may assess a scoring penalty.

3/10/17 – VTA-The 15.5" step height meets ADA and California Title 13 regulations and the APTA standard bus procurement guidelines.

3/15/17- VTA-Proterra must assure ADA ramp slope requirements are met.

7/17/17-VTA-VTA approved Ricon 621SA ramp or Lift-U LU18.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
6	Proterra Inc	TS 7.3.3	111

Complete description of Deviation:
Proterra does not offer programmable acceleration and deceleration.

Rationale "pros and cons" (list any attachments):
Proterra cannot allow its customers access to the controls software that allows for the programming of acceleration or deceleration, as there are also safety related controls functions that are accessible in the same software code, creating a potential safety hazard / liability.
11/16 – Proterra - Proterra does not offer programmable modes for the motor torque demand curve. We have spent a great deal of time perfecting the motor torque curve in order to provide the world's best performing and most efficient electric bus. However, in the event that the buses were not performing adequately, Proterra would work with VTA in order to determine how to best address the issue, including the possibility of adjusting the motor torque demand curve.
2/28/17-Proterra - At the Negotiation Meeting Proterra stated they are withdrawing this deviation request.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 6. VTA - We are only asking for a couple of selected able modes, such as Low, Med, & High, not full control of the motor torque demand curve.

11/29/16 – VTA - VTA requires performance mode adjustments as originally requested. A scoring penalty will be assessed.

2-28-17-VTA – VTA appreciates that you are adhering to the original specification.

CER 6. Form for Proposal Deviation or Approved Equal

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 of each of the requested deviations without any price/cost information is to be placed in the Technical Proposal, as specified in "Technical Proposal Requirements". A separate copy of each of the requested deviations with any price/cost information should be placed in the Price Proposal as specified in "Price Proposal Requirements." This form is for informational purposes and does not modify the RFP. RFP modifications will only be made by means of issuing an addendum, not through this form. Proposers shall complete the areas above the shaded strip and attach any supporting documentation to this form. The CER 6. Form for Proposal Deviation or Approved Equal is due by the Proposal Due Date deadline.

VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
7	Proterra Inc	TS 9.3.2	113

Complete description of Deviation:
Proterra's battery-electric buses are not offered with rear run controls.

Rationale "pros and cons" (list any attachments):
Rear run controls aren't required for battery-electric buses.

11/16 – Proterra - Diagnostic ports are available inside the vehicle behind the operator and at the rear of the interior of the vehicle. Some diagnostics information is also available via the dash monitor.

3/10/17 – Proterra Proterra will provide rear run controls for the vehicle

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 7. VTA - Some type of rear interface and inspection panel is expected, preferably with a quick check gauge that is capable of displaying various drive system parameters.

12/12/16 - VTA -- Approved

PROTERRA

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
8	Proterra Inc	TS 9.3.2	113

Complete description of Deviation:
The Proterra Catalyst does not provide a means to connect a spare drive control module for servicing the propulsion system.

Rationale "pros and cons" (list any attachments):

11/16 – Proterra - After further discussion, Proterra misunderstood the original requirement. Proterra's Catalyst bus can meet this requirement already. Proterra withdraws this deviation.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification □ See addendum □ Denied X See response below

Agency response:

10/3/16 8. VTA - Can Proterra explain why using a test drive system invertor or drive controller attached to the correct harness connectors will not operate the bus? Are Proterra buses configured such that the drive invertor and controller and uniquely tied to the drive unit and cannot be interchanged?

12/12/16 - VTA – Approved.

3/15/17-VTA, Thank you for adhering to VTA's original specification.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
9	Proterra Inc	TS 9.3.2	113

Complete description of Deviation:
The Proterra Catalyst does not offer a drive hour meter, voltmeter for the 12 volt system, a voltmeter for the 24 volt system and an energy storage main SOC and temperature gauge in the service compartment.

Rationale "pros and cons" (list any attachments):
11/16 – Proterra - Diagnostic ports are available inside the vehicle behind the operator and at the rear of the interior of the vehicle. Some diagnostics information is also available via the dash monitor.
3/10/17- Proterra - Proterra will provide a digital display in the rear motor compartment that will allow technicians to access data they would have been able to access with the driver hour meter, voltmeter for 12v and 24 v systems and an energy storage Main SOC and temp gauge.

VTA's Use Only **Date Agency Received:** _____

Agency action:			
	X Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	X See response below

Agency response:
10/3/16 9. VTA - VTA expects that these gauges/meters are provided.

12/12/16 - VTA - Denied - this is a critical service statistic that must be monitored. A scoring penalty will be assessed.

2/28/17-VTA-During the Negotiation Meeting Proterra committed to providing a diagnostic port and rear run start/stop in the "engine" compartment (deviation 35) partially meets the specification. A scoring penalty will be assessed for the missing requirements.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
10	Proterra Inc	TS 9.3.3	114

Complete description of Deviation:
The Proterra propulsion system offers nominal ~360VDC, less than the required 400-700VDC.

Rationale "pros and cons" (list any attachments):

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
11	Proterra Inc	TS 9.3.3	115

Complete description of Deviation:
The distance between main battery terminals shall be beyond the mechanics reach.

Rationale "pros and cons" (list any attachments):

11/16 – Proterra - No deviation required. The main battery terminals are not exposed to the mechanics.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification □ See addendum □ Denied X See response below

Agency response:

10/3/16 11. VTA - Provide dimensional drawings of the electrical terminals for each battery module as installed on both buses being offered (XR+ and E2).

12/12/16 - VTA - - Noted and thanks for adhering to the original specification.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
12	Proterra Inc	TS 9.3.4	116

Complete description of Deviation:
The interior of the drive energy storage compartment is note vented.

Rationale "pros and cons" (list any attachments):
The HV battery packs are located under the bus, so no venting required. The battery packs are already water/weather tight.

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	□ See response below

Agency response:

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
13	Proterra Inc	TS 9.3.6	119

Complete description of Deviation:
High Voltage Disconnect System

Rationale "pros and cons" (list any attachments):
Our high voltage disconnect system does not operate as described. Our system has 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. A number of different conditions can disable these contactors.

11/16 – Proterra - Please refer to Chapter 8 of the sample Catalyst Maintenance and Repair Manual.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 13. VTA - Provide electrical schematic of complete HV power routing clearly showing contactor layout and all fuses.

12/12/16 - VTA – Approved, acceptable documentation was provided.

PROTERRA

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
14	Proterra Inc	TS 10	119

Complete description of Deviation:
The Proterra Catalyst does not have a sight glass to determine coolant level.

Rationale "pros and cons" (list any attachments):
Instead, our vehicle uses a level sensor and an LED indicator.

11/16 – Proterra - Proterra is willing to determine an alternative way to check coolant level, even if it's just providing a dipstick on the cap.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 14. VTA - VTA requires a direct non-electronic method of checking coolant level. An overflow or leveling tank would be another acceptable option. VTA is open to other methods as well.

12/12/16 - VTA - Approved with the condition that Proterra provide full vendor support when determining alternatives.

2/28/17-VTA - During Negotiation Meeting Proterra agreed to address this issue with their standard design and VTA approved.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
15	Proterra Inc	TS 10	120

Complete description of Deviation:
The Proterra Catalyst does not come with a switch for manual fan activation.

Rationale "pros and cons" (list any attachments):
Our standard vehicle does not have a switch for manual cooling fan activation.
11/16 – Proterra - VTA will have the ability to control the fan through use of the Logena diagnostics tool.
3/10/17- Proterra - A manual switch is not required for a non-diesel/combustion engine system with radiators located on the roof. Our bus does not have any combustion byproducts that contaminate coolant. Additionally, the pressures and temps are significantly lower than those on a combustion engine vehicle. Lastly, we do have serviceable filters in our coolant system easily accessed in the rear of the vehicle.

VTA's Use Only **Date Agency Received:** _____

Agency action:			
	□ Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	X Denied	X See response below

Agency response:
10/3/16 15. VTA - In general VTA prefers direct fan control for service purposes, with a switch at the rear of the vehicle. VTA is open to having manual control though a computer interface.

12/12/16 - VTA - - This configuration is unacceptable for VTA's regular operation and a scoring penalty will be assessed.

2/28/17-VTA-Configuration discussed further at the Negotiation Meeting and still remains a challenge for VTA. A scoring penalty will be assessed.

3/15/17-VTA-Noted; however, a scoring penalty will be assessed for not meeting the specification.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
16	Proterra Inc	TS 11	121

Complete description of Deviation:
The Proterra Catalyst transmission is not automatically shifted in traditional sense. The Proterra Catalyst uses an electronically-controlled pneumatically shifted 2-speed gear box (transmission) provided by Eaton.

Rationale "pros and cons" (list any attachments):
The Eaton transmission is one of the reason that the Catalyst broke acceleration and efficiency records at Altoona.

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	□ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
17	Proterra Inc	TS 12	122

Complete description of Deviation:
When the Proterra Catalyst is using regenerative braking, amber lights are illuminated on the rear of the vehicle.

Rationale "pros and cons" (list any attachments):
Proterra did not believe it was prudent to illuminate the standard brake lights when the vehicle was only in regenerative braking mode.

11/16 – Proterra - Proterra can accommodate changing this configuration to show regeneration braking "red" although there might be a small price adjustment during the BAFO period.

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	X See response below

Agency response:
10/3/16 17. VTA - VTA's extensive experience with Hybrid system regeneration and has shown this lighting configuration to be operationally preferable, and is required.

12/12/16 - VTA - - Noted and thanks for adhering to the original specification; however, since the submitted price proposal doesn't include this feature a scoring penalty will be assessed. Proterra can address pricing during the Negotiation/BAFO stage.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
18	Proterra Inc	TS 12	122

Complete description of Deviation:
The regenerative braking function is not adjustable by the customer.

Rationale "pros and cons" (list any attachments):
Our standard vehicle does not have adjustable regenerative braking. The Catalyst electric bus uses regenerative braking that recaptures up to 92% energy which helps the overall vehicle efficiency and also serves to slow the vehicle and extend the life of the service brakes.

11/16 – Proterra - Proterra does not offer programmable modes for the motor torque demand curve. We have spent a great deal of time perfecting the motor torque curve in order to provide the world's best performing and most efficient electric bus. However, in the event that the buses were not performing adequately, Proterra would work with VTA in order to determine how to best address the issue, including the possibility of adjusting the motor torque demand curve.

3/10/17 – Proterra - Proterra remains unable to adjust regen braking.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum X Denied X See response below

Agency response:
10/3/16 18. VTA - VTA is requesting a couple of selected able modes, such as Low, Med, & High, not full control of the motor torque demand curve.

12/12/16 - VTA - - Though VTA expects all proposers to provide a vehicle optimized for both range and performance, VTA requires the ability to adjust these parameters within a safe operable range. A scoring penalty will be assessed.

2/28/17-VTA-During Negotiations Proterra stated they may address through BAFO stage. VTA would like to address prior to BAFO submission.

3/15/17-VTA-Noted; however, a scoring penalty will be assessed for not meeting the specification.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
19	Proterra Inc	TS 13.1	123

Complete description of Deviation:
The Proterra Catalyst does not have gauges and/or displays in the drive compartment.

Rationale "pros and cons" (list any attachments):

While the Proterra Catalyst propulsion system is arranged for ease of access and maintenance, all of the diagnostics associated with the system are accessed either via the dash or through the Logena diagnostic tool + laptop.

11/16 – Proterra - Diagnostic ports are available inside the vehicle behind the operator and at the rear of the interior of the vehicle. Some diagnostics information is also available via the dash monitor.

3/10/17 – Proterra, Proterra will provide a digital display in the rear motor compartment that will allow technicians to access ESS and electric drive unit status as required by TS 13.1. This deviation is withdrawn.

VTA's Use Only **Date Agency Received:** _____

Agency action:			
	□ Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	X See response below

Agency response:

10/3/16 19. VTA - VTA expects service and maintenance interfaces to be provided at the rear of the coach. We are open to working with the Vendor to define exactly what information and controls will be provided.

11/29/2016 – VTA - Diagnostics interfaces are required as specified in the original RFP. Missing interfaces will result in the assessing of a scoring penalty.

3/15/17-VTA-Thank you for adhering to the original specification.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
20	Proterra Inc	TS 17.3.1	126

Complete description of Deviation:

The Proterra Catalyst offered herein only contains one plug-in charging access port on the curb-side of the vehicle.

Rationale "pros and cons" (list any attachments):

While it's not impossible to design a dual-sided charging port, Proterra believes that the expense of doing so would vastly outweigh the alternative that exist, such as ceiling-mounted cable assistors that would make it easier for technicians to access the curb-side charging ports when the buses street side was closest to the charging island.

11/16 – Proterra - Proterra is willing to provide dual-sided charging, although there may be a price and/or schedule adjustment required during the BAFO stage.

2/28/17-Proterra - At the Negotiation Meeting Proterra withdrew this deviation request.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied X See response below

Agency response:

10/3/16 20. VTA -VTA requires charger connections on both sides of the vehicle. VTA expect the chargers to be installed outdoors without an available ceiling. VTA is open to discussing alternative charger configurations that would accommodate center island charger location, but expects the additional cost/installation/labor/design of a "special" charging connector to be included in the proposal price.

12/12/16 - VTA – Noted and thanks for adhering to the original specification; however, the dual sided charger location was part of the original RFP. The bus proposals are expected to have this feature as it is required for VTA's operation. Since the submitted price proposal doesn't include this feature a scoring penalty will be assessed.

2/28/17-VTA-VTA appreciates that Proterra has withdrawn this deviation request and is adhering to the original specification.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
21	Proterra Inc	TS 17.3.2 & 17.3.3	127

Complete description of Deviation:

Neither the inductive nor conductive charging interfaces meet the requirement to "automatically perform all of the steps necessary to align the bus with the charger"

Rationale "pros and cons" (list any attachments):
The conductive charging system proposed herein includes a semi-autonomous charging scenario that speed limits the vehicle, but ultimately leaves the driver in control of the bus. The optional inductive charging system does not include an automatic docking procedure.

11/16 – Proterra - Completely automatic charging as described in the spec is not available for Proterra's vehicles. That said, transit agencies across the United States are successfully operating Proterra fast-charge buses that utilize the semi-autonomous conductive overhead charging and maintaining timely and consistent operation in service.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum X Denied X See response below

Agency response:
10/3/16 21. VTA - VTA expects that all vendors provide automatic en-route charger docking feature. This is to ensure timely and consistent in service operation.

12/12/16 - VTA - - Noted, however the proposer fails to meet the RFP request, thus a scoring penalty will be assessed.

2/28/17-VTA-VTA expects that we will need this feature in the future; therefore, a scoring penalty will be assessed.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
22	Proterra Inc	TS 18.3.3	131

Complete description of Deviation:
For the Proterra Catalyst E2 vehicle with 440kWh of on-board energy storage, Proterra is not offering an optional inductive charging system.

Rationale "pros and cons" (list any attachments):
In addition to our belief that the vehicle contains sufficient on-board energy to eliminate the need for on-route charging, Proterra's placement of four (4) high voltage battery packs under the 40 foot Catalyst E2 vehicle prevents us from installing a secondary receiver required for the WAVE inductive charging system.

11/16 – Proterra - The 40' Catalyst E2 vehicle with 440kWh of on-board energy storage does not have enough space under the bus to install the secondary receiver required to accept an inductive charge.

VTA's Use Only **Date Agency Received:** _____

Agency action:			
	□ Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	X Denied	X See response below

Agency response:
10/3/16 22. VTA – VTA is unclear what the future of BEB's in transit service will look like, and expects its vehicles to be compatible with all charging types, this includes both en route chargers on all vehicles being offered.

12/12/16 - VTA - - Noted, however the proposer fails to meet the RFP request, thus a scoring penalty will be assessed.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
23	Proterra Inc	TS 25	134

Complete description of Deviation:
The Proterra Catalyst has two dedicated tow pockets located under the front of the bus and would not recommend towing from the front axle.

Rationale "pros and cons" (list any attachments):

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
24	Proterra Inc	TS 31.3.4	140

Complete description of Deviation:
Kneeling - our vehicle rises to a height sufficient to permit the bus to resume service in 4 seconds, instead of 2.

Rationale "pros and cons" (list any attachments):
While we don't meet the VTA specifications, we do meet the APTA white book specification which is 4 seconds.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
25	Proterra Inc	TS 33.2.2	142

Complete description of Deviation:
Proterra requests approval for a 3 spoke steering wheel instead of the specified 4 spoke steering wheel.

Rationale "pros and cons" (list any attachments):
Common components are easier for Proterra relative to installation and maintainability.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied □ See response below

Agency response:

PROTERRA

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
26	Proterra Inc	TS 36.1	144

Complete description of Deviation:
Service Brakes - Request approval for Disc Brakes. The Proterra Catalyst uses Knorr-Bremse disc brakes/

Rationale "pros and cons" (list any attachments):
We have self-adjusting 4 wheel disc brakes. Disc brakes are standard on Proterra Catalyst vehicles and superior to drum brakes in performance. More details can be found in the Proterra technical proposal.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
27	Proterra Inc	TS 36.2	144

Complete description of Deviation:
Actuation for braking - our specification is at 75 lbs, not the required 50 lbs

Rationale "pros and cons" (list any attachments):
Seeking approval for the 75 lbs. braking force to achieve maximum braking.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
28	Proterra Inc	TS 38.2	147

Complete description of Deviation:
The air compressor currently charges the air system in less than 4 minutes; longer than the required 3 minutes.

Rationale "pros and cons" (list any attachments):
More details about the air system can be found in Proterra's Technical Proposal.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
29	Proterra Inc	TS 38.2	147

Complete description of Deviation:
Request approval to use a Hydrovane electric motor driven air compressor instead of the oil-less compressor specified in the RFP.

Rationale "pros and cons" (list any attachments):
The Hydrovane air compressor is sized appropriately for the air system requirements and duty cycle of the Proterra Catalyst.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied □ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
30	Proterra Inc	TS 38.5	148

Complete description of Deviation:
Request approved equal to use the Graham White QBA-15 air dryer instead of the specified Bendix AD-9 air dryer.

Rationale "pros and cons" (list any attachments):
The Graham White QBA-15 air dryer provides the same / similar performance as the Bendix A-9 air dryer. Specifications for the Graham White air dryer are listed below:

Parameter	Specification
Air Dryer Model	Graham-White QBA15 NX7
Maximum Pressure	150 P.S.I.G.
Minimum Operating Pressure (after pump up)	60 P.S.I.G.
Maximum Inlet Air Temperature	200°F
Operating Ambient Temperature Range	-40°F to 150°F
Inlet Port	1/2" NPT
Outlet Port	1/2" NPT
Unloader Port	1/4" NPT
Voltage	24 VDC

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification

☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
31	Proterra Inc	TS 39	149

Complete description of Deviation:
Communications hub does not have an available RS232 interface.

Rationale "pros and cons" (list any attachments):
RS232 interface is not available.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
32	Proterra Inc	TS 41.1.4	151

Complete description of Deviation:
Whitaker 15126. Our standard jump start connector is the Anderson 913 SB350 series.

Rationale "pros and cons" (list any attachments):
11/16 – Proterra - Proterra can comply with the Whitaker connector although there may be a slight price adjustment during the BAFO stage.

2/28/17-Proterra - Proterra withdrew this deviation request at the Negotiation Meeting.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied X See response below

Agency response:
10/3/16 32. VTA - Our fleet, and service trucks all use the Whitaker connector, it is easy to source, and is expected.
12/12/16 - VTA – Noted and thanks for adhering to the original specification; however, the connector was part of the original RFP, and should have been included with the original proposal pricing. Since the submitted price proposal doesn't include this feature a scoring penalty will be assessed.
2/28/17-VTA-VTA appreciates that Proterra has withdrawn this deviation request and will be adhering to the specifications.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
33	Proterra Inc	TS 41.1.5	151

Complete description of Deviation:
Battery compartment - request approval to have a square key on access door to master battery disconnect switch (VTA requirement is no locking mechanism)

Rationale "pros and cons" (list any attachments):
11/16 - Proterra – Proterra can comply with this requirement with a possible adjustment to the pricing in the BAFO stage.

2/28/17-Proterra - Proterra withdrew this deviation request at the Negotiation Meeting.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied X See response below

Agency response:
10/3/16 33. VTA - The configuration listed in the RFP matches our current fleet and is required.

12/12/16 - VTA – Noted and thanks for adhering to the original specification; however, since the submitted price proposal doesn't include this feature a scoring penalty will be assessed.

2/28/17-VTA-VTA appreciates that Proterra has withdrawn this deviation request and will be adhering to the specifications.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
34	Proterra Inc	TS 41.3	154

Complete description of Deviation:
Approval to use loom rated to 110C instead of drive unit compartment conduit.

Rationale "pros and cons" (list any attachments):
Our standard configuration uses loom rated to 110C (230F). Our motor compartment is typically no hotter than 10C above ambient.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
35	Proterra Inc	TS 41.5	155

Complete description of Deviation:
"Rear start and run" controls

Rationale "pros and cons" (list any attachments):
Rear start and run controls are not applicable to an electric drive system.
11/16 – Proterra - Diagnostic ports are available inside the vehicle behind the operator and at the rear of the interior of the vehicle. Some diagnostics information is also available via the dash monitor.
2/28/17-Proterra - Proterra withdrew this deviation request at the Negotiation Meeting.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 35. VTA - VTA expects service and maintenance interfaces to be provided at the rear of the coach. We are open to working with the Vendor to define exactly what information and controls will be provided.

12/12/16 - VTA – Denied, and a scoring penalty will be assessed.

2/28/17-VTA-VTA appreciates that Proterra has withdrawn this deviation request and will be adhering to the specifications.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
036	Proterra Inc	TS 43.1	157

Complete description of Deviation:
Multiplex modules shall utilize LEDs.

Rationale "pros and cons" (list any attachments):
Our standard configuration is not equipped with LEDs, however, individual I/O status can be reviewed in a maintenance screen on the dash.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied □ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
37	Proterra Inc	TS 43.1	157

Complete description of Deviation:
Each circuit shall be capable of providing a current load up to 10 amperes.

Rationale "pros and cons" (list any attachments):
The Continental VDO Kibes-32 Multiplex system has a number of different outputs ranging from 1A to 15A.

11/16 – Proterra – Confirmed

3/10/17 – Proterra - Proterra has included a sample schematic of MUX1 and MUX2 and images of actual harnesses on the vehicle with this submittal.

VTA's Use Only **Date Agency Received:** _____

Agency action:			
	□ Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	X Denied	X See response below

Agency response:

10/3/16 - VTA - Approved if each circuit connection is properly labeled with its maximum load.

12/12/16 – VTA – Approved with the condition that each circuit connection is properly labeled with its maximum load.

2/28/17-VTA - During Negotiations VTA requested that Proterra send pictures and schematics to review.

3/15/17 – VTA - Information provided did not show what VTA required, a penalty will be assessed

PROTERRA

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
38	Proterra Inc	TS 43.1	157

Complete description of Deviation:
The Proterra Catalyst parameter settings do not reside in a separate file.

Rationale "pros and cons" (list any attachments):
This is not available. The parameter settings are part of the program logic and to change will require changing the programming. This is a simple process and very easy to do.

11/16 – Proterra - VTA will be given access to program all configurable items on the MUX.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied X See response below

Agency response:
10/3/16 38. VTA - Approved assuming that VTA will have full access to make the required programming changes.

12/12/16 - VTA – Approved, with the condition that VTA have full access to make the required programming changes and not just access to the configurable items on the MUX.

2/28/17 - VTA –At the Negotiation Meeting Proterra confirmed they will provide VTA access, except for mutually agreed to safety critical items.

CER 6. Form for Proposal Deviation or Approved Equal

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 of each of the requested deviations without any price/cost information is to be placed in the Technical Proposal, as specified in "Technical Proposal Requirements". A separate copy of each of the requested deviations with any price/cost information should be placed in the Price Proposal as specified in "Price Proposal Requirements." This form is for informational purposes and does not modify the RFP. RFP modifications will only be made by means of issuing an addendum, not through this form. Proposers shall complete the areas above the shaded strip and attach any supporting documentation to this form. The CER 6. Form for Proposal Deviation or Approved Equal is due by the Proposal Due Date deadline.

VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
39	Proterra Inc	TS 43.1	157

Complete description of Deviation:
Reprogramming the multiplex software and firmware

Rationale "pros and cons" (list any attachments):
Reprogramming the Multiplex software/firmware is not available.

11/16 – Proterra - VTA will be given access to program all configurable items on the MUX.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 39. VTA - Multiplex changes are common place in the transit world, and VTA requires the ability and knowledge base necessary to make such changes. VTA does not plan or for see making those changes without the input of the contractor.
12/12/16 - VTA – Approved, with the condition that VTA have full access to make the required programming changes and not just access to the configurable items on the MUX. A scoring penalty will be assessed.
2/28/17 - VTA –At the Negotiation Meeting Proterra confirmed they will provide VTA access, except for safety critical items and VTA approved.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
40	Proterra Inc	TS 44.2.1	159

Complete description of Deviation:
Diagnostics, Fault Detection and Data Access

Rationale "pros and cons" (list any attachments):
Much of the information required will be provided however, some information is considered proprietary and cannot be provided. Proterra will provide a more detailed list of available information.
11/16 – Proterra - Please reference Chapter 4 On-Board Diagnostics of the Catalyst Maintenance and Repair Manual.
3/10/17 – Proterra - Proterra has provide a detailed list of "Customer Accessible Data" along with this submittal. Additionally, Proterra is withdrawing this deviation.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification
□ See addendum □ Denied X See response below

Agency response:
10/3/16 40. VTA - Please provide the list mentioned for review.

12/12/16 - VTA - Full access is required as requested. A scoring penalty will be assessed.

2/28/17-VTA-At the Negotiation Meeting VTA requested that Proterra provide the detailed list, and if the list is adequate the scoring penalty will be reduced or eliminated.

3/15/17 – VTA - VTA appreciates that Proterra has withdrawn this deviation request and will be adhering to the specifications.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
41	Proterra Inc	TS 44.3.1	159

Complete description of Deviation:
Wireless communication to the multiplex system.

Rationale "pros and cons" (list any attachments):
Currently, we do not have a wireless communication system to the multiplex system.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied □ See response below

Agency response:

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
042	Proterra Inc	TS 44.3.1	159

Complete description of Deviation:
Reprogramming the multiplex software and firmware

Rationale "pros and cons" (list any attachments):
Reprogramming the Multiplex software/firmware is not available.

11/16 – Proterra - VTA will be given access to program all configurable items on the MUX.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 42. VTA - Multiplex changes are common place in the transit world, and VTA requires the ability and knowledge base necessary to make such changes. VTA does not plan or for see making those changes without the input of the contractor.
12/12/16 - VTA - Full access is required as requested, not simply access only to the *configurable items* on the MUX. A scoring penalty will be assessed.
2/28/17 - VTA –At the Negotiation Meeting Proterra confirmed they will provide VTA access, except for safety critical items and VTA approved.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
43	Proterra Inc	TS 45.4	162

Complete description of Deviation:
Our standard layout includes switches / controls on a horizontal surface in driver's area

Rationale "pros and cons" (list any attachments):
More detailed information regarding the operator's area can be found in the technical proposal.
11/16 – Proterra - Proterra will work with VTA operations to incorporate the vehicle controls layout to best match the existing fleet. Depending on the level of requested changes, there may be a price adjustment required although we will work with VTA in order to minimize any change order pricing.

VTA's Use Only **Date Agency Received:** _____

Agency action:			
	□ Approved	X Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	X See response below

Agency response:
10/3/16 43. VTA - VTA expects all proposers to work with VTA operations to adapt the vehicle control layout to best match VTA's existing fleet.

12/12/16 – VTA – Approved, with the condition that Proterra will work with VTA Operations as outlined above.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
44	Proterra Inc	TS 45.4	162

Complete description of Deviation:
Push-button switches shall include lighted status indicators.

Rationale "pros and cons" (list any attachments):
Our standard vehicle utilizes the dash display for status indications. They are not present on the lighted switches.

11/16 – Proterra - See response to Deviation No. 43.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved X Approved w/Conditions □ Request More Info/Clarification □ See addendum □ Denied X See response below

Agency response:
10/3/16 44. VTA - VTA expects all proposers to work with VTA operations to adapt the vehicle control layout to best match VTA's existing fleet. This is particularly the case for the door control which must be the standard door switch, and not a push button.

12/12/16 – VTA – Approved, with the condition that Proterra will work with VTA Operations as detailed above.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
45	Proterra Inc	TS 45.4	162

Complete description of Deviation:
Request approved equal for our standard instrumentation and controls

Rationale "pros and cons" (list any attachments):
Standard instrumentation and controls are outlined in detail in our technical proposal.

11/16 – Proterra - See response to Deviation No. 43.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved X Approved w/Conditions □ Request More Info/Clarification □ See addendum □ Denied X See response below

Agency response:
10/3/16 45. VTA - VTA expects all proposers to work with VTA operations to adapt the vehicle control layout to best match VTA's existing fleet.

12/12/16 – VTA - Approved, with the condition that Proterra work with VTA Operations as outlined above.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	**Contractor:**	**RFP section:**	**Page:**
46	Proterra Inc	TS 45.5	163

Complete description of Deviation:
The LCD screen shall show the exit door exterior camera view.

Rationale "pros and cons" (list any attachments):
We do not currently have the ability to display video on the dash screen; only via a separate display.

11/16 – Proterra - Proterra can accommodate the rear camera feed into the dash, but will want to ensure VTA understands any limitations caused by the screen resolution.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum Denied X See response below

Agency response:
10/3/16 46. VTA - Having multiple monitors is operational challenging, and VTA strongly prefers the monitor dash integration.

12/12/16 – VTA - Approved & noted.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
47	Proterra Inc	TS 45.5	163

Complete description of Deviation:
The interface shall include all error messages.

Rationale "pros and cons" (list any attachments):
Currently the dash will not display all diagnostic information. It will display all annunciations (Red, Yellow and other icons). In a maintenance mode you can display additional information about red level faults (i.e. fault description and a troubleshooting aid). Yellow level and lower faults require the use of the diagnostic tool to get further information. In general, the diagnostics tool is intended to be the primary interface for trouble shooting the vehicle, not the dash display.

11/16 – Proterra - Please refer to Chapter 4 On-Board Diagnostics of the Catalyst Maintenance and Repair manual for more details on the diagnostic capabilities available at the dash and via the Logena diagnostic tool.

2/28/17- Proterra - Proterra withdrew this deviation request at the Negotiation Meeting.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 47. VTA - Though approved, VTA has a strong interest in having a unified bus maintenance and diagnostics system built directly into the dash/dash screens.

12/12/16 - VTA - Noted, and denied. A scoring penalty may be assessed.

2/28/17-VTA-VTA appreciates that Proterra has withdrawn this deviation request and will be adhering to the specifications.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
48	Proterra Inc	TS 45.5	163

Complete description of Deviation:
The multi-function display shall have data logging capability.

Rationale "pros and cons" (list any attachments):

The data logging system is separate from the dash display.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied □ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
49	Proterra Inc	TS 52.5	177

Complete description of Deviation:
The Proterra Catalyst vehicles come standard with a rear window

Rationale "pros and cons" (list any attachments):

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
50	Proterra Inc	TS 54	179

Complete description of Deviation:
The Proterra Catalyst utilizes an Eberspacher HVAC to achieve optimal performance.

Rationale "pros and cons" (list any attachments):
Proterra's vehicles were designed from a clean sheet, allowing us to find the optimal HVAC system for our electric bus. The unit we selected from Eberspächer allows us to maximize efficiency and performance. Additionally, this unit allows us to cool the energy storage system and the primary electronic devices. More details about the Eberspächer HVAC are included in the technical proposal.

11/16 – Proterra - Please see the attached additional information on the Eberspächer AC136 AE G3 HVAC.

3/10/17 – Proterra - Proterra will provide the additional three-year warranty for the Eberspächer HVAC.

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	□ Approved w/Conditions	X Request More Info/Clarification
	□ See addendum	□ Denied	X See response below

Agency response: **10/3/16 50. VTA** - In order to receive approval for an HVAC that VTA has no experience with we require the following: complete maintenance, service and parts manuals (Electronic copy OK), Unit in-service life data (who is using them, where, and how long) Mean time between failure for key sub-components (compressor, condenser, electric drive, fans etc.), and estimate maintenance and repair times for key services and sub-component replacements.

12/12/16 - VTA - Approved, with a scoring penalty, VTA retains concerns about unit in service durability; therefore, VTA requires the warranty coverage for an additional 3 years of coverage.

2/28/17-VTA-During Negotiation Meeting Proterra agreed to provide a local service representative and will explore offering VTA an extended warranty to alleviate VTA's concerns.

3/15/17-VTA - With Proterra's confirmation of the additional 3 years of warranty this is approved.

CER 6. Form for Proposal Deviation or Approved Equal

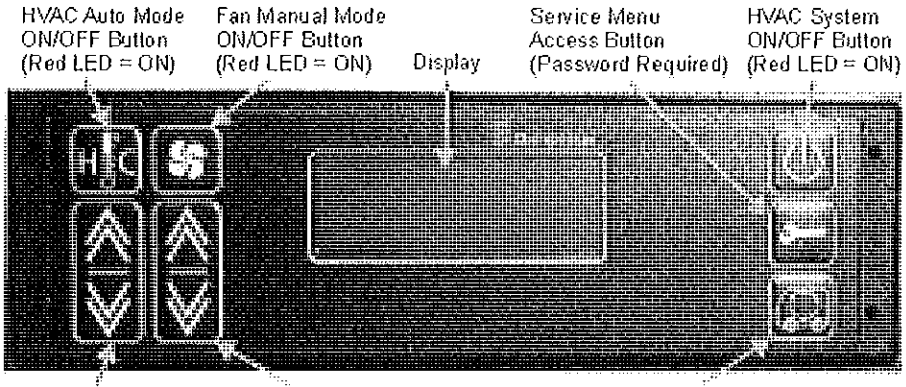
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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
51	Proterra Inc	TS 55.3	180

Complete description of Deviation:
The HVAC controls are located on the operator's side console

Rationale "pros and cons" (list any attachments):



11/16 – Proterra - Please see additional information for the Eberspaecher AC136 AE G3 HVAC.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 – VTA - See Deviations #50 response
12/12/16 - VTA - Approved, with a scoring penalty, VTA retains concerns about unit in service durability.
3/10/17 – VTA - Please see response above.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
52	Proterra Inc	TS 55.4	181

Complete description of Deviation:
The HVAC does not provide fresh air in the foot area.

Rationale "pros and cons" (list any attachments):

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification □ See addendum □ Denied □ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
53	Proterra Inc	TS 58	182

Complete description of Deviation:
The Proterra Catalyst does not have high and low refrigerant gauges.

Rationale "pros and cons" (list any attachments):
A sight glass is provided on the forward cowl near the escape hatch.

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	□ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
054	Proterra Inc	TS 62	184

Complete description of Deviation:
We do not currently offer a S-1 Guard or equivalent.

Rationale "pros and cons" (list any attachments):
11/16 – Proterra - Proterra can install an S-1 Gard or equivalent with an adjustment to the pricing during the BAFO stage.

3/10/17 – Proterra - Proterra will be providing and installing an S-1 Gard.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied X See response below

Agency response:
10/3/16 54. VTA - Approved if the vendor is willing to commit to working with agency on integrating it into the bus pre/post delivery.

12/12/16 - VTA - Noted and approved for S-1 Gard only, because all alternative equals should have been submitted with the proposal. A scoring penalty remains in place as this was part of the original RFP. Proterra can address pricing through the Negotiation/BAFO stage of this solicitation.

3/15/17-VTA-Noted and thank you for adhering to VTA's original specification.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
55	Proterra Inc	TS 63.1	184

Complete description of Deviation:
Side Panels - composite body is monocoque without side body panels.

Rationale "pros and cons" (list any attachments):
The composite body is described in detail in the technical proposal.
11/16 – Proterra - The composite layout of the body differs across the body design as some areas contain carbon fiber for additional strength and some are standard composite with a balsa core. Regarding the repair procedures, Proterra provided a sample repair procedure with our additional information request from October 14th. We will provide our FEA for additional detail.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum X Denied X See response below

Agency response:
10/3/16 55. VTA - VTA requires more details about how panels and structure are layout and repaired. Cross-sectional drawings of the exterior panels, and detailed repair instructions for light, medium and heavy damage is required.
12/12/16 - VTA – The additional provided information was marginal. Proterra answered some questions, but left others hanging. A scoring penalty will be assessed. VTA expects tech drawings and final FEA design analysis to be provided at Negotiations.
2/28/17-VTA-During the Negotiation Meeting Proterra agreed to provide the Exova test and cross sectional drawings.
3/15/17 VTA Drawings provided are appreciated, but in the continued absence of the promised testing data VTA has to deny this with a scoring penalty.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
56	Proterra Inc	TS 64	184

Complete description of Deviation:
Rain gutters that are integral to the composite body

Rationale "pros and cons" (list any attachments):
Proterra's Catalyst vehicles employ a uniquely designed roof profile that channels water away from passenger entrance and exit areas.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
57	Proterra Inc	TS 72.3	190

Complete description of Deviation:
Turn Signals on rear of bus are currently red and in rectangular housings

Rationale "pros and cons" (list any attachments):

11/16 – Proterra - Proterra will comply with this request.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved X Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 57. VTA - Light shape is approved, but the number of lamps must match VTA's requirements, (2 amber, one red on each side, and one red in the center).

12/12/16-VTA, Noted and approved with the conditions outlined above.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
58	Proterra Inc	TS 72.4	190

Complete description of Deviation:
Headlights - we do not currently offer adaptive lighting as described in the RFP.

Rationale "pros and cons" (list any attachments):
The Proterra Catalyst uses LED lamps from Hella.

11/16 – Proterra - Proterra will work with VTA operations if any "dark spot" issues are evident during nighttime operation.

3/10/17- Proterra – Proterra does not have a direction-of-travel feature during turning events, although we have turn signals on both on the front and side of the vehicle that illuminate during a turning event. Proterra stands committed to working with VTA if any dark spots are evident during turning events at night.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum X Denied X See response below

Agency response:

10/3/16 58. VTA - Approved assuming that the vendor is committed to work with VTA operations to work out any "dark spot" issues in the driver's normal field of vision during night time operation.

12/12/16 – VTA – Noted and approved, but VTA expects Proterra's full support in resolving any issues.

2/28/17-VTA-During the Negotiation Meeting VTA requested that Proterra provide cornering headlights (additional headlight luminescence in the direction of a turn, activated with the turn signals). Proterra to provide more information on the design and if they can provide. This is in addition to their previous commitment to address any dark spot issues in straight ahead headlight use that have occurred in some small LED headlight designs.

3/15/17 VTA- The required lights aren't that hard to do, a scoring penalty will be assessed.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
59	Proterra Inc	TS 74.1.1	191

Complete description of Deviation:
We keep the fire extinguisher and flare kits, etc. in the street side wheel well box

Rationale "pros and cons" (list any attachments):

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied □ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
60	Proterra Inc	TS 74.10	195

Complete description of Deviation:
A separate service switch to activate lighting during bus cleaning.

Rationale "pros and cons" (list any attachments):
The standard configuration does not have this switch. The lighting system can be activated by placing the Master Run switch into any position other than Off, by activating the Hazard Flashers, or by pressing the Front Door Open switch on the exterior of the vehicle.

11/16 – Proterra - Proterra will provide a separate "sweeper" switch.

VTA's Use Only **Date Agency Received:** _____

Agency action:			
	X Approved	☐ Approved w/Conditions	☐ Request More Info/Clarification
	☐ See addendum	Denied	X See response below

Agency response:
10/3/16 60. VTA - This switch is required for VTA night time cleaning procedures.

12/12/16 – VTA - Noted and approved.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
61	Proterra Inc	TS 74.12	195

Complete description of Deviation:
Interior lighting system shall provide a minimum 15 foot-candle illumination.

Rationale "pros and cons" (list any attachments):
Our standard configuration provides an average of 9 foot-candle illumination.

11/16 – Proterra - Proterra will meet this requirement.

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	Denied	X See response below

Agency response:
10/3/16 61. VTA - VTA requires the majority of the bus interior to meet 15 foot-candles of illumination with all interior lights on.

12/12/16 – VTA - Noted and approved.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
62	Proterra Inc	TS 76	197

Complete description of Deviation:
We currently don't have any interior access panels that are hinged with gas props or over-center springs.

Rationale "pros and cons" (list any attachments):
We have tethered interior access panels for overhead access panels previously.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied □ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
63	Proterra Inc	TS 76.1	197

Complete description of Deviation:
We do not offer floor access panels

Rationale "pros and cons" (list any attachments):
The HV battery packs are located directly under the floor.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied ☐ See response below

Agency response:

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
64	Proterra Inc	TS 79.4	205

Complete description of Deviation:
We have full length glazing on the rear doors instead of the requested top sections only

Rationale "pros and cons" (list any attachments):
11/16 – Proterra - We can meet this request although it may require an adjustment to the pricing during the BAFO stage.

3/10/16 - Proterra – Deviation is withdrawn, doors will be provided as required by the RFP.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 64. VTA - The lower door sections get kicked regularly, and we require metal in those sections, at a minimum on the rear door.

12/12/16 – VTA – Noted and approved, but with a scoring penalty in place as proposed pricing didn't include this feature. Proterra can address pricing through the Negotiation/BAFO stage of the procurement.

3/15/17-VTA-Thank you for adhering to the original RFP specification.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.: 65	**Contractor:** Proterra Inc	**RFP section:** TS 79.7.1	**Page:** 206
Complete description of Deviation: Rear door stop/reverse with 20-lb force instead of requested 10-lb force			
Rationale "pros and cons" (list any attachments):			
VTA's Use Only		**Date Agency Received:** _____	
Agency action: X Approved		□ Approved w/Conditions	□ Request More Info/Clarification
□ See addendum		□ Denied	□ See response below
Agency response:			

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
~~077~~ 66	Proterra Inc	TS 79.10	207

Complete description of Deviation:
Door control - doesn't currently provide a tactile feedback (light feedback on button)

Rationale "pros and cons" (list any attachments):

11/16 – Proterra - Proterra has researched the standard 5-position switch and found some that are electric, but they communicate via CAN which will not work for our vehicle.

3/10/17 - Proterra – Deviation is now withdrawn as we will provide the 5-position door switch

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved □ Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied X See response below

Agency response:

10/3/16 66. VTA - (Proterra accidently listed as 77 in the documentation) VTA requires the standard door control switch.

12/12/16 - VTA - VTA is very disappointed that Proterra cannot support the industry standard for on board vehicle communication networks. A scoring penalty will be assessed for failing to comply with this standard as well not providing the required 5 position switch.

2/28/17-VTA-During the Negotiation Meeting VTA approved with the condition that Proterra provide the classic 5 position door switch.

3/15/17 VTA- VTA appreciates that Proterra has withdrawn this deviation request and will be adhering to the specifications.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
67	Proterra Inc	TS 79.11.1	208

Complete description of Deviation:
The Ventura Doors on the Proterra Catalyst are opened and closed using a push button on the side console.

Rationale "pros and cons" (list any attachments):
The Proterra push button controls offer the same functionality as the door-control handle. More details around the door controls can be found in the technical proposal.

11/16 – Proterra - Proterra has researched the standard 5-position switch and found some that are electric, but they communicate via CAN which will not work for our vehicle.

3/10/17 - Proterra – The deviation is now withdrawn as we will provide the 5-position door switch as originally requested.

VTA's Use Only **Date Agency Received:** _____

Agency action: ☐ Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification ☐ See addendum ☐ Denied X See response below

Agency response:
10/3/16 67. VTA - VTA requires the standard door control switch.
12/12/16 - VTA - - VTA is very disappointed that Proterra cannot support the industry standard for on board vehicle communication networks. A scoring penalty will be assessed for failing to comply with this standard as well not providing the required 5 position switch.
2/28/17-VTA-During the Negotiation Meeting VTA approved with the condition that Proterra provide the classic 5 position door switch.
3/15/17-VTA-Thank you for adhering to the original RFP specification.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	**Contractor:**	**RFP section:**	**Page:**
68	Proterra Inc	TS 82.2	214

Complete description of Deviation:
The composite body does not currently include provisions for an exterior advertising display

Rationale "pros and cons" (list any attachments):

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	X See response below

Agency response:

10/3/16 68. VTA, Modern advertisements are all vinyl decals, no ad frames are required.

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
69	Proterra Inc	TS 84	216

Complete description of Deviation:
Sliding drawers for communications access.

Rationale "pros and cons" (list any attachments):
Our standard configuration does not utilize a sliding drawer in the communications compartment. We would like to present our standard design and show how VTA's equipment would be packaged and accessed.

11/16 – Proterra - Proterra will work with VTA in order to ensure that all customer equipment is properly packaged for ease of access and serviceability. If Proterra cannot put forth a design that satisfies VTA, we will plan to install sliding drawers as requested.

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	☐ Approved w/Conditions	X Request More Info/Clarification
	☐ See addendum	☐ Denied	X See response below

Agency response:
10/3/16 69. VTA - The proposer must show the vehicle has significant capacity for the integration of new and additionally electronics and radio equipment in the future.

12/12/16 - VTA - Noted and approved.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
70	Proterra Inc	TS 84.6	221

Complete description of Deviation:
Equipment enclosure "Radio Box".

Rationale "pros and cons" (list any attachments):
Our standard configuration has a different size radio box (40" wide, 20" deep and 10" high). We would like to present our standard design and show how VTA's equipment would be packaged and accessed.

11/16 – Proterra - Proterra will work with VTA in order to ensure that the radio equipment is properly packaged for ease of access and serviceability.

VTA's Use Only **Date Agency Received:** _____

Agency action:	X Approved	□ Approved w/Conditions	X Request More Info/Clarification
	□ See addendum	□ Denied	X See response below

Agency response:
10/3/16 70. VTA - The proposer must show the vehicle has significant capacity for the integration of new and additionally electronics and radio equipment in the future.

12/12/16 - VTA - Noted and approved.

CER 6. Form for Proposal Deviation or Approved Equal

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VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
71	Proterra Inc	TS 84.6	222

Complete description of Deviation:
GPS Antenna must be located at least 1 meter from other radiating elements.

Rationale "pros and cons" (list any attachments):
Our standard configuration would place GPS antennas within 1 meter of other antennas. We have been very successful system operation when locating GPS antennas in this configuration.

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved □ Approved w/Conditions □ Request More Info/Clarification □ See addendum □ Denied □ See response below

Agency response:

CER 6. Form for Proposal Deviation or Approved Equal

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 of each of the requested deviations without any price/cost information is to be placed in the Technical Proposal, as specified in "Technical Proposal Requirements". A separate copy of each of the requested deviations with any price/cost information should be placed in the Price Proposal as specified in "Price Proposal Requirements." This form is for informational purposes and does not modify the RFP. RFP modifications will only be made by means of issuing an addendum, not through this form. Proposers shall complete the areas above the shaded strip and attach any supporting documentation to this form. The CER 6. Form for Proposal Deviation or Approved Equal is due by the Proposal Due Date deadline.

VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
74	Proterra Inc	Appendix A	284

Complete description of Deviation:
RFP states that ceiling and wall panels are to be removed after water test to inspect for leaks. Request waiver on this.

Rationale "pros and cons" (list any attachments):
It is not feasible to remove ceiling and wall panels on a completed bus. This would require major disassembly and would create numerous quality and reliability issues. All access panels can be opened after the test to inspect for leaks. This method has been proven to be effective

VTA's Use Only **Date Agency Received:** _____

Agency action: X Approved ☐ Approved w/Conditions ☐ Request More Info/Clarification

☐ See addendum ☐ Denied ☐ See response below

Agency response:

CER 6. Form for Proposal Deviation or Approved Equal

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 of each of the requested deviations without any price/cost information is to be placed in the Technical Proposal, as specified in "Technical Proposal Requirements". A separate copy of each of the requested deviations with any price/cost information should be placed in the Price Proposal as specified in "Price Proposal Requirements." This form is for informational purposes and does not modify the RFP. RFP modifications will only be made by means of issuing an addendum, not through this form. Proposers shall complete the areas above the shaded strip and attach any supporting documentation to this form. The CER 6. Form for Proposal Deviation or Approved Equal is due by the Proposal Due Date deadline.

VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
75	Proterra Inc	WR 1.1.8	226

Complete description of Deviation:
Request for change to ESS cell serial number tracking. Should be tracked on a module level

Rationale "pros and cons" (list any attachments):
Modules are the lowest changeable ESS part.

11/16 – Proterra - Please see response to Deviation No. 1.

3/10/17 – Proterra – This deviation is now withdrawn

VTA's Use Only **Date Agency Received:** _____

Agency action:			
	□ Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	□ Denied	X See response below

Agency response:
10/3/16 75. VTA - VTA expects that in the future ESS modules will be remanufactured in house by VTA personnel, as such we request ESS module and cell details are required.
12/12/16 – VTA - Though VTA understands the reasoning behind this request. VTA will treat it as a request only. Once VTA has accepted delivery of the bus it will be free to do as it sees fit to maintain and operate the bus. A scoring penalty will be assessed.
2/28/17-VTA-At the Negotiation Meeting VTA stated that Proterra substantially meets the intent of the spec with level of ESS serialization they committed to provide at the Negotiation Meeting. Any scoring penalty will be reduced accordingly. Proterra stated they wanted to double check the spec to confirm if they can withdrawal this deviation request.
3/15/17 VTA- VTA appreciates that Proterra has withdrawn this deviation request and will be adhering to the specifications.

CER 6. Form for Proposal Deviation or Approved Equal

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 of each of the requested deviations without any price/cost information is to be placed in the Technical Proposal, as specified in "Technical Proposal Requirements". A separate copy of each of the requested deviations with any price/cost information should be placed in the Price Proposal as specified in "Price Proposal Requirements." This form is for informational purposes and does not modify the RFP. RFP modifications will only be made by means of issuing an addendum, not through this form. Proposers shall complete the areas above the shaded strip and attach any supporting documentation to this form. The CER 6. Form for Proposal Deviation or Approved Equal is due by the Proposal Due Date deadline.

VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
76	Proterra Inc	Addendum 9 (CER 8.7)	1

Complete description of Deviation:
Proterra is taking a deviation to the new SP 10. Source Code Escrow requirements.

Rationale "pros and cons" (list any attachments):
Proterra is willing to give a contractual commitment to keep the subsystem software operational; but unable to provide the Source Code Escrow Account at this time.

11/16 – Proterra - Proterra will comply with this requirement.

VTA's Use Only **Date Agency Received:** _____

Agency action:	□ Approved	□ Approved w/Conditions	□ Request More Info/Clarification
	□ See addendum	Denied	X See response below

Agency response:
10/3/16 76. VTA - The escrow account provides VTA much need protection to keep the buses in service in case of vendor default, and is required.

12/12/16 – VTA - Noted and approved.

3/15/17 – VTA – Thank you for adhering to the original RFP specification.

CER 6. Form for Proposal Deviation or Approved Equal

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 of each of the requested deviations without any price/cost information is to be placed in the Technical Proposal, as specified in "Technical Proposal Requirements". A separate copy of each of the requested deviations with any price/cost information should be placed in the Price Proposal as specified in "Price Proposal Requirements." This form is for informational purposes and does not modify the RFP. RFP modifications will only be made by means of issuing an addendum, not through this form. Proposers shall complete the areas above the shaded strip and attach any supporting documentation to this form. The CER 6. Form for Proposal Deviation or Approved Equal is due by the Proposal Due Date deadline.

VTA RFP#P16130 40' Low Floor Full Battery Electric Transit Buses

Deviation No.:	Contractor:	RFP section:	Page:
77	Proterra Inc	NR 1	18

Complete description of Deviation:
Pilot build of one bus to be completed 150 days prior to the beginning of the rest of the build

Rationale "pros and cons" (list any attachments):
If all buses are required by December 2017, Pilot Bus would need to be delivered by June 2017 which does not seem feasible given current procurement timelines. Perhaps the pilot bus could be delivered 60 or 90 days prior to beginning the rest of the build?

11/16 – Proterra - Proterra is open to negotiating with VTA in order to determine the approach to producing a pilot bus that meets these requirements as quickly as possible.

VTA's Use Only **Date Agency Received:** _____

Agency action: □ Approved X Approved w/Conditions □ Request More Info/Clarification

□ See addendum □ Denied X See response below

Agency response:

10/3/16 77. VTA - VTA is open to negotiating exact delivery dates as a part of the BAFO process.

12/12/16 – VTA - Noted, VTA is open to negotiating the exact delivery schedule of the pilot buses.

7/17/17 – VTA - Please reference CER 3. Request for Pre-Offer Change Request#3 for RFP#P16265 for VTA's final response.

Santa Clara Valley Transportation Authority

Solutions that move you

CONTRACT No. P16130

THIS CONTRACT ("Contract") is between **Proterra, Inc.** (Contractor) and the **Santa Clara Valley Transportation Authority** (VTA). This Contract expresses the terms and conditions for the purchase of: (i) 5 Forty Foot Low Floor Full Battery Electric Transit Buses and Charging Equipment; (ii) an option to purchase up to 2 automatic conductive en route chargers; and (iii) an option to purchase up to 25 additional buses of the same configuration to be exercised no later than five (5) years from the Effective Date (as defined below in the signature block).

Contractor and VTA, for the consideration hereinafter named, agree as follows:

1. CONTRACT COMPONENTS

All the documents listed below are either attached hereto or deemed incorporated by reference as if fully set forth herein. The documents below constitute the entire agreement between the parties hereto and are collectively referenced as "Contract P16130."

1) This document (hereinafter "Short Form Contract") and any amendments thereto.

a. Exhibit 1 – Price Schedule, Proterra Best and Final Offer, dated April 3, 2017
b. Exhibit 2 – Project Schedule, dated June 12, 2018
c. Exhibit 3 – Key Personnel, dated October 27, 2017
d. Exhibit 4 – Warranty Coverage Schedule, dated April 4, 2017
e. Exhibit 5 – VTA RFP No. P16130, dated May 31, 2016
f. Exhibit 6 – (i) RFP Addenda Numbers 1 through 15, and (ii) Questions and Answers I through V, Pre-Offer Change Requests, and Requests for Proposed Deviations or Approved Equals:
   - Addendum No. 1, dated June 1, 2016
   - Addendum No. 2, dated June 24, 2016
   - Addendum No. 3, dated July 15, 2016
   - Addendum No. 4, dated August 5, 2016
   - Addendum No. 5, dated August 12, 2016
   - Addendum No. 6, dated August 17, 2016
   - Addendum No. 7, dated August 18, 2016
   - Addendum No. 8, dated August 24, 2016
   - Addendum No. 9, dated September 1, 2016
   - Addendum No. 10, dated September 29, 2016
   - Addendum No. 11, dated September 29, 2016

- Addendum No. 12, dated October 19, 2016
- Addendum No. 13, dated March 20, 2017
- Addendum No. 14, dated March 27, 2017
- Addendum No. 15, dated April 10, 2017
- Questions and Answers Part I, dated August 5, 2016
- Questions and Answers Part II, dated October 6, 2016
- Questions and Answers Part III, dated January 4, 2017
- Questions and Answers Part IV, dated March 20, 2017
- Questions and Answers Part V, dated April 11, 2017
- VTA's Answers to Vendor Request for Pre-Offer Change CER 3s, submitted for RFP No. P16130 dated August 5, 2016
- VTA's Answers to Vendor Request for Proposal Deviation or Approved Equal to CER 6s, submitted for RFP No. P16130 dated October 6, 2016, January 4, 2017, and March 15, 2017 with VTA's final response dated April 6, 2017

2) Proterra Best and Final Offer, dated April 3, 2017 (not appended to the Contract, but incorporated by reference herein)

3) Proterra Proposal, dated September 15, 2016 (not appended to the Contract, but incorporated by reference herein)

2. CONTRACT ORDER OF PRECEDENCE

In case of any conflict among these documents where the parties' intended resolution is not clear, the order of precedence shall be:

1) Short Form Contract No. P16130 and any amendments thereto

2) Proterra Updated Proposal, dated March 17, 2017

3) Proterra's Clarification for their Updated Proposal, dated March 13, 2017

4) Proterra Proposal, dated September 15, 2016

3. SCOPE OF WORK

Contractor shall furnish all necessary qualified personnel, labor, materials, tools, equipment, technical expertise, services and incidentals to furnish 5 Forty Foot Low Floor Full Battery Electric Transit Buses and Charging Equipment as described in RFP No. P16130 Forty Foot Low Floor Full Battery Electric Transit Buses Scope of Work (dated May 31, 2016) and any addenda thereto.

4. TERM OF CONTRACT

This Contract is effective as of the Effective Date (as defined below in the signature block). The Contractor shall commence work after the effective date of

the Contract. The Contract completion date shall be 15 days after the final delivery and acceptance of all Contract deliverables.

The base Contract contains orders for 5 Forty Foot Low Floor Full Battery Electric Transit Buses and Charging Equipment. The Contract delivery date for the 5 buses shall be no later than August 4, 2019.

VTA may exercise the options by written notice ("Notice of Exercise of Option") to Proterra at any time on or before five (5) years following the Effective Date. If an option is exercised, the option vehicles or the option items shall be delivered in accordance with the schedule contained in the Notice of Exercise of Option.

5. CHARGER PROJECT DELAY:

If completion of the charger portion of the project is delayed (regardless of the which party is responsible for the delay), but VTA otherwise finds the buses themselves acceptable, VTA may apply a retention of 10% of the total Contract price for the buses until the chargers are installed and fully functional in accordance with TS 18 et seq.

6. CONTRACT PRICE

VTA shall pay Contractor at the rates stated in Exhibit 1 – Price Schedule, Proterra Best and Final Offer, dated April 3, 2017.

7. COMPREHENSIVE BUS PARTS LIST

Contractor shall provide VTA with a comprehensive parts list in an editable Microsoft Excel format. The comprehensive parts list shall include descriptions, the Original Manufacturer Name, and Manufacturer Part Number for each part used in this bus build. Contractor must submit this comprehensive parts list with its submission of the Bus Parts Manuals, both of which are due 60 calendar days after VTA's receipt of the first production bus.

8. CONTRACT COVENANT:

If Proterra files for bankruptcy or becomes insolvent (as reasonably determined by Proterra), Proterra shall, within thirty (30) calendar days of either such occurrence, provide VTA with the following:

1. Battery field rebuild, training and service information;
2. Traction motor field rebuild, training and service information; and
3. Training information and manuals on various security sensitive items.

In connection with such, Proterra shall reasonably cooperate with VTA's transition to another provider and shall pay VTA up to, but not exceeding, ten thousand dollars ($10,000) in amounts actually and reasonably incurred by VTA in connection with VTA's transition to another provider. Proterra shall make any

such payments within forty-five (45) days after receipt of a valid and undisputed invoice.

9. ENTIRE AGREEMENT

This Contract constitutes the complete and entire agreement between VTA and the Contractor and supersedes any prior representations, understandings, communications, commitments, agreements or Proposals, oral or written, which are not incorporated as a part of the Contract.

10. GOVERNING LAW

The laws of the State of California will govern these terms and conditions, as well as any claim that might arise between Contractor and VTA, without regard to conflict of law provisions.

11. FORUM SELECTION

Contractor will resolve any claim, cause of action or dispute (hereinafter a "Claim") that Contractor has with VTA arising out of or related to this Contract in a state or federal court located in Santa Clara County, California. Contractor agrees to submit to the personal jurisdiction of the courts located in Santa Clara County, California for the purpose of litigating all such Claims.

12. COUNTERPARTS

This Contract may be executed in counterparts, each of which shall constitute an original, but all of which constitute one instrument.

13. AUTHORIZED REPRESENTATIVES, NOTICES AND POINTS OF CONTRACT:

The Authorized Representatives identified below, or assigned designees, have authority to authorize changes to the scope, terms and conditions of this Contract, as set forth herein.

A. AUTHORIZED REPRESENTATIVES:

Santa Clara Valley Transportation Authority
Mr. Thor Vue
Chief Procurement Officer
3331 N. First Street, Building A
San Jose, CA 95134-1906
thor.vue@vta.org

Proterra
Mr. Ryan Popple
President and CEO
1815 Rollins Road
Burlingame, CA 94010
rpopple@proterra.com

B. NOTICES: Notices shall be in writing and addressed to the Authorized Representatives at the address set forth above.

C. POINTS OF CONTACT: The Points of Contact listed below are authorized to communicate regarding contract matters, except in the case where the correspondence regarding legal notices must be addressed to the Authorized Representatives.

VTA:
Ms. Keisha Carnahan
Sr. Contract Administrator
3331 N. First Street, Building A
San Jose, CA 95134-1906
keisha.carnahan@vta.org

Mr. James Wilhelm
Sr. Mechanical Engineer
3331 N. First Street, Building B
San Jose, CA 95134-1906
james.wilhelm@vta.org

Proterra:
Mr. Ethan Carbaugh
Bid and Proposal Manager
1 Whitlee Court
Greenville, SC 29607
ecarbaugh@proterra.com

Mr. T.J. Nass
Customer Program Manager
383 Cheryl Lane
Walnut, CA 91789
tnass@proterra.com

D. WRITTEN NOTIFICATION: Written notification to the other party shall be provided, in advance, of changes in the names or addresses of the designated Authorized Representatives or Points of Contact stated above.

14. SERVICE OF NOTICE

Any notice required or permitted to be given by this Contract shall be deemed given when personally delivered to recipient thereof or mailed by registered or certified mail, return receipt requested, postage prepaid, to the appropriate recipient thereof.

In witness whereof, VTA and CONTRACTOR have executed this Contract No. P16130 as of the last date set forth below ("Effective Date").

SANTA CLARA VALLEY TRANSPORTATION AUTHORITY

Nuria I. Fernandez 10.18.18
Nuria I. Fernandez Date
General Manager/CEO

PROTERRA

9-27-18
Ryan Popple Date
President and CEO

Approved as to Form:

10/16/2018
Caroline Kim Date
Assistant Counsel

EXHIBIT 2

Fill in this information to identify the case:

Debtor Proterra Inc

United States Bankruptcy Court for the: _____ District of Delaware (State)

Case number 23-11120

Official Form 410
Proof of Claim

04/22

Read the instructions before filling out this form. This form is for making a claim for payment in a bankruptcy case. Do not use this form to make a request for payment of an administrative expense. Make such a request according to 11 U.S.C. § 503.

Filers must leave out or redact information that is entitled to privacy on this form or on any attached documents. Attach redacted copies or any documents that support the claim, such as promissory notes, purchase orders, invoices, itemized statements of running accounts, contracts, judgments, mortgages, and security agreements. **Do not send original documents;** they may be destroyed after scanning. If the documents are not available, explain in an attachment.

A person who files a fraudulent claim could be fined up to $500,000, imprisoned for up to 5 years, or both. 18 U.S.C. §§ 152, 157, and 3571.

Fill in all the information about the claim as of the date the case was filed. That date is on the notice of bankruptcy (Form 309) **that you received.**

Part 1: Identify the Claim

1. **Who is the current creditor?**
   Santa Clara Valley Transportation Authority
   Name of the current creditor (the person or entity to be paid for this claim)
   Other names the creditor used with the debtor _____

2. **Has this claim been acquired from someone else?**
   ☑ No
   ☐ Yes. From whom? _____

3. **Where should notices and payments to the creditor be sent?**
   Federal Rule of Bankruptcy Procedure (FRBP) 2002(g)

Where should notices to the creditor be sent?	**Where should payments to the creditor be sent?** (if different)
See summary page	See summary page
Contact phone 415-516-5200	Contact phone _____
Contact email mharrington@greenfieldlaw.com	Contact email greg.richardson@vta.org

   Uniform claim identifier for electronic payments in chapter 13 (if you use one):
   _____

4. **Does this claim amend one already filed?**
   ☑ No
   ☐ Yes. Claim number on court claims registry (if known) _____ Filed on _____ MM / DD / YYYY

5. **Do you know if anyone else has filed a proof of claim for this claim?**
   ☑ No
   ☐ Yes. Who made the earlier filing? _____

23111202311130000000000037

Part 2: Give Information About the Claim as of the Date the Case Was Filed

6. **Do you have any number you use to identify the debtor?**

☑ No

☐ Yes. Last 4 digits of the debtor's account or any number you use to identify the debtor: ___ ___ ___ ___

7. **How much is the claim?** $ 880,786.98 . **Does this amount include interest or other charges?**

☑ No

☐ Yes. Attach statement itemizing interest, fees, expenses, or other charges required by Bankruptcy Rule 3001(c)(2)(A).

8. **What is the basis of the claim?**

Examples: Goods sold, money loaned, lease, services performed, personal injury or wrongful death, or credit card.

Attach redacted copies of any documents supporting the claim required by Bankruptcy Rule 3001(c).

Limit disclosing information that is entitled to privacy, such as health care information.

See summary page

9. **Is all or part of the claim secured?**

☑ No

☐ Yes. The claim is secured by a lien on property.

Nature or property:

☐ Real estate: If the claim is secured by the debtor's principle residence, file a *Mortgage Proof of Claim Attachment* (Official Form 410-A) with this *Proof of Claim*.

☐ Motor vehicle

☐ Other. Describe: _____

Basis for perfection: _____

Attach redacted copies of documents, if any, that show evidence of perfection of a security interest (for example, a mortgage, lien, certificate of title, financing statement, or other document that shows the lien has been filed or recorded.)

Value of property: $_____

Amount of the claim that is secured: $_____

Amount of the claim that is unsecured: $_____ (The sum of the secured and unsecured amount should match the amount in line 7.)

Amount necessary to cure any default as of the date of the petition: $_____

Annual Interest Rate (when case was filed)_____%

☐ Fixed

☐ Variable

10. **Is this claim based on a lease?**

☑ No

☐ Yes. **Amount necessary to cure any default as of the date of the petition.** $_____

11. **Is this claim subject to a right of setoff?**

☑ No

☐ Yes. Identify the property: _____

2311120231113000000000037

12. **Is all or part of the claim entitled to priority under 11 U.S.C. § 507(a)?**

A claim may be partly priority and partly nonpriority. For example, in some categories, the law limits the amount entitled to priority.

	Amount entitled to priority
☑ No	
☐ Yes. *Check all that apply:*	
☐ Domestic support obligations (including alimony and child support) under 11 U.S.C. § 507(a)(1)(A) or (a)(1)(B).	$_____
☐ Up to $3,350* of deposits toward purchase, lease, or rental of property or services for personal, family, or household use. 11 U.S.C. § 507(a)(7).	$_____
☐ Wages, salaries, or commissions (up to $15,150*) earned within 180 days before the bankruptcy petition is filed or the debtor's business ends, whichever is earlier. 11 U.S.C. § 507(a)(4).	$_____
☐ Taxes or penalties owed to governmental units. 11 U.S.C. § 507(a)(8).	$_____
☐ Contributions to an employee benefit plan. 11 U.S.C. § 507(a)(5).	$_____
☐ Other. Specify subsection of 11 U.S.C. § 507(a)(__) that applies.	$_____

* Amounts are subject to adjustment on 4/01/25 and every 3 years after that for cases begun on or after the date of adjustment.

13. **Is all or part of the claim entitled to administrative priority pursuant to 11 U.S.C. 503(b)(9)?**

☑ No

☐ Yes. Indicate the amount of your claim arising from the value of any goods received by the debtor within 20 days before the date of commencement of the above case, in which the goods have been sold to the Debtor in the ordinary course of such Debtor's business. Attach documentation supporting such claim.

$_____

Part 3: Sign Below

The person completing this proof of claim must sign and date it. FRBP 9011(b).

If you file this claim electronically, FRBP 5005(a)(2) authorizes courts to establish local rules specifying what a signature is.

A person who files a fraudulent claim could be fined up to $500,000, imprisoned for up to 5 years, or both. 18 U.S.C. §§ 152, 157, and 3571.

Check the appropriate box:

☐ I am the creditor.

☑ I am the creditor's attorney or authorized agent.

☐ I am the trustee, or the debtor, or their authorized agent. Bankruptcy Rule 3004.

☐ I am a guarantor, surety, endorser, or other codebtor. Bankruptcy Rule 3005.

I understand that an authorized signature on this *Proof of Claim* serves as an acknowledgement that when calculating the amount of the claim, the creditor gave the debtor credit for any payments received toward the debt.

I have examined the information in this *Proof of Claim* and have reasonable belief that the information is true and correct.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on date 11/13/2023
MM / DD / YYYY

/s/Maureen A. Harrington
Signature

Print the name of the person who is completing and signing this claim:

Name: Maureen A. Harrington
First name Middle name Last name

Title: Attorney for Creditor Santa Clara Valley Transportation Authority

Company: Greenfield LLP
Identify the corporate servicer as the company if the authorized agent is a servicer.

Address

Contact phone _____ Email _____

23111202311130000000000037

KCC ePOC Electronic Claim Filing Summary

For phone assistance: Domestic (888) 251-3076 | International (310) 751-2617

Debtor:
23-11120 - Proterra Inc
District:
District of Delaware

Creditor:
Santa Clara Valley Transportation Authority
Maureen A. Harrington, Esq.
Greenfield LLP
55 South Market Street
Suite 1500
San Jose, CA, 95113
United States
Phone:
415-516-5200
Phone 2:
408-995-5600
Fax:
Email:
mharrington@greenfieldlaw.com

Has Supporting Documentation:
Yes, supporting documentation successfully uploaded
Related Document Statement:

Has Related Claim:
No
Related Claim Filed By:

Filing Party:
Authorized agent

Disbursement/Notice Parties:
Santa Clara Valley Transportation Authority
Greg Richardson
Assistant GM/Chief Financial Officer
3331 North First St., C-2
San Jose, CA, 95134
Phone:
Phone 2:
Fax:
E-mail:
greg.richardson@vta.org
DISBURSEMENT ADDRESS

Other Names Used with Debtor:

Amends Claim:
No
Acquired Claim:
No

Basis of Claim:
Damages arising from sale of defective buses to creditor, total amount is still under investigation.

Last 4 Digits:
No

Uniform Claim Identifier:

Total Amount of Claim:
880,786.98

Includes Interest or Charges:
No

Has Priority Claim:
No

Priority Under:

Has Secured Claim:
No
Amount of 503(b)(9):
No
Based on Lease:
No
Subject to Right of Setoff:
No

Nature of Secured Amount:
Value of Property:
Annual Interest Rate:
Arrearage Amount:
Basis for Perfection:
Amount Unsecured:

VN: 8B1714AE57B887913C651436CF4635CB

Submitted By:
Maureen A. Harrington on 13-Nov-2023 1:40:08 p.m. Eastern Time
Title:
Attorney for Creditor Santa Clara Valley Transportation Authority
Company:
Greenfield LLP

EXHIBIT 3

From: Moynihan, Kelly E. <KMoynihan@lowenstein.com>
Sent: Tuesday, September 2, 2025 10:23 AM
To: Maureen Harrington <MHarrington@greenfieldlaw.com>
Cc: Chafetz, Eric S. <EChafetz@lowenstein.com>; Bill McMahon <bmcmahon@provincefirm.com>
Subject: Proterra Inc - Santa Clara Valley Transportation Authority Claim

Maureen,

Our firm represents the Distribution Trustee in the Proterra bankruptcy cases (Bankr. D. Del. Case No. 23-11120). The Distribution Trustee is in the process of reconciling certain remaining claims in order to make distributions and wind down the Trust promptly. We reviewed the claim filed by Santa Clara Valley Transportation Authority and note that Santa Clara asserted that the final amount was still under investigation. Can you please provide the final liquidated amount of the claim and documentation supporting this amount so we can liquidate Santa Clara's claim for distributions?

The Distribution Trustee reserves all rights with respect to the filed claim and any amended proof of claim and amended claim amount filed by Santa Clara.

Thank you.

Kelly E. Moynihan
Counsel
Lowenstein Sandler LLP

T: (212) 419-5890



Lowenstein Sandler

This message contains confidential information, intended only for the person(s) named above, which may also be privileged. Any use, distribution, copying or disclosure by any other person is strictly prohibited. In such case, you should delete this message and kindly notify the sender via reply e-mail. Please advise immediately if you or your employer does not consent to Internet e-mail for messages of this kind.