

Request for Proposal

City of Durham Transit

Finance Department
Purchasing Division



All Electric 30- 40ft. Transit Buses with
Inductive Charging and Associated
Equipment with an Option for Six
Additional Buses

Bid No. 19-0037

SECTION 1: NOTICE OF REQUEST FOR PROPOSALS	12
NR 1. Description of the Work to be Done	12
NR 2. GoDurham System Wide Route Map	13
NR 3. Proposal Due Date and Submittal Requirements	14
NR 4. Validity of Proposals	14
NR 5. Pre-Proposal Meeting Information(Optional)	14
SECTION 2: INSTRUCTIONS TO PROPOSERS	15
IP 1. Quantities.	15
IP 2. Proposed Schedule for the Procurement	15
IP 3. Pre-Proposal Meeting/Information for Proposers	15
IP 4. Questions, Clarifications and Omissions	15
IP 5. Addenda to RFP	16
IP 6. DBE Requirements for Transit Vehicle Manufacturers	16
IP 7. Buy America Certification	17
IP 8. Conditions, Exceptions, Reservations or Understandings	18
IP 9. Protest Procedures	18
IP 9.1 Address	18
IP 9.2 Pre-Proposal Protests	18
IP 9.3 Protests on the Recommended Award	19
IP 9.4 FTA Review	19
IP 10. Preparation of Proposals	19
IP 10.1 Use of Proposal Forms	19
IP 10.2 Proposal Format Requirements	19
IP 10.3 Signing of Proposal Forms	21
IP 10.4 Modification or Withdrawal of Proposals	21
IP 11. Proposal Evaluation, Negotiation and Selection	21
IP 11.1 Evaluation Committee	21
IP 11.2 Review of Proposals for Responsiveness and Proposers for Responsibility	21
IP 11.3 Proposal Selection Process	22
IP 11.4 Evaluation Procedure	22
IP 11.5 Evaluations of Competitive Proposals	22
IP 12. Response to Proposals	23
IP 12.1 Single Proposal Response	23
IP 12.2 Availability of Funds	23
IP 12.3 Agency Contract Approval Process	24
IP 12.4 Execution of Contract	24
SECTION 3: GENERAL CONDITIONS	24
GC 1. Materials and Workmanship	24
GC 2. Conformance with Specifications and Drawings	24
GC 3. Inspection, Testing and Acceptance	24
GC 3.1 General	24
GC 3.2 Risk of Loss	25
GC 4. Title and Warranty of Title	25
GC 5. Intellectual Property Warranty	25
GC 6. Data Rights	25
GC 6.1 Proprietary Rights/Rights in Data	25
GC 6.2 Access to Onboard Operational Data	26

GC 7. Changes	26
GC 7.1 Contractor Changes	26
GC 7.2 Agency Changes	26
GC 8. Legal Clauses	26
GC 8.1 Indemnification	26
GC 8.2 Suspension of Work	27
GC 8.3 Excusable Delays/Force Majeure	27
GC 8.4 Termination	28
GC 8.4.1 Termination for Convenience	28
GC 8.4.2 Termination for Default	29
GC 8.5 Compliance with Laws and Regulations	30
GC 8.6 Changes of Law	30
GC 8.7 Governing Law and Choice of Forum	30
GC 8.8 Disputes	30
GC 8.9 Maintenance of Records; Access by Agency; Right to Audit Records.	31
GC 8.10 General Nondiscrimination Clause	31
GC 8.11 Amendment and Waiver	32
GC 8.11.1 Amendment	32
GC 8.11.2 Waiver	32
GC 8.12 Remedies Not Exclusive.....	32
GC 8.13 Counterparts	32
GC 8.14 Severability.....	32
GC 8.15 Third-Party Beneficiaries.....	32
GC 8.16 Assignment of Contract.....	32
GC 8.17 Independent Parties	32
SECTION 4: SPECIAL PROVISIONS	33
SP 1. Inspection, Tests and Repairs	33
SP 1.1 Repair Performance	33
SP 1.1.1 Repairs by Contractor	33
SP 1.1.2 Repairs by the Agency	33
SP 1.2 First Article Inspection-Production	33
SP 1.3 Post-Delivery Tests	34
SP 1.4 Repairs after Non-Acceptance	34
SP 2. Deliveries	34
SP 2.1 Bus Delivery	34
SP 2.2 Delivery Schedule	34
SP 2.3 Contract Deliverables	34
SP 3. Options and Option Pricing	37
SP 4. Assignability of Options	38
SP 5. Payment	38
SP 5.1 Payment Terms	38
SP 5.2 Payment of Taxes	38
SP 6. Liquidated Damages for Late Delivery of the Bus.....	38
SP 7. Service and Parts.....	39
SP 7.1 Contractor Service and Parts Support.....	39
SP 7.2 Documentation.....	39
SP 7.3 Parts Availability Guarantee.....	39
SP 7.4 Agency-Furnished Property.....	40
SP 8. Federal Motor Vehicle Safety Standards (FMVSS).....	40
SP 9. Insurance.	40

SP 10. Software Escrow Account.....	41
SP 11. Sustainability.....	41
SECTION 5: ACCEPTANCE TEST	41
AT 1. Responsibility.....	41
AT 2. Pre-Delivery Tests.....	41
AT 2.1 Visual and Measured Inspection	42
AT 2.2 Total Bus Operation	42
AT 3. Post Delivery Tests.....	42
AT 3.1 Visual Inspection	42
AT 3.2 Total Bus Operations	42
SECTION 6: WARRANTY PROVISION.....	43
WP1. Warranty Requirements	43
WP 1.1 Contractor Warranty	43
WP 1.2 Complete Bus	43
WP 1.3 Body and Chassis Structure	43
WP 1.4 Propulsion System	43
WP 1.5 Major Subsystems	43
WP 1.6 Extension of Warranty	44
WP 2. Voiding of Warranty	44
WP 3. Exceptions and Additions to Warranty	44
WP 4. Detection of Defects	44
WP 5. Scope of Warranty Repairs	44
WP 6. Fleet Defects	44
WP 6.1 Occurrence and Remedy	44
WP 6.2 Exceptions to Fleet Defect Provisions	45
WP 7. Product Recalls	45
WP 8. Repair Basic Provision	45
WP 8.1 Repair Performance	45
WP 8.2 Repair by Contractor	45
WP 9. Repair by the City	45
WP 9.1 Parts Used	45
WP 9.2 Contractor Supplied Parts	45
WP 9.3 Defective Components Return	46
WP 9.4 Failure Analysis	46
WP 9.5 Reimbursement for Parts	46
WP 9.6 Reimbursement Requirements	46
WP 9.7 Warranty After Replacement/Repairs	46
SECTION 7: TRAINING PROVISIONS.....	46
TP 1. Overall Training Requirements	46
TP 2. Base Bus Training	47
TP 2.1 Train-the-Trainer	47
TP 2.2 Basic Operators Training.....	47
TP 2.3 Basic Vehicle Maintenance	48
TP 2.4 Base Bus Maintenance Orientation	48
TP 2.5 AC/Heat System	48
TP 3. Optional Technical Training(See Price Schedule)	48
TP 3.1 Bus Maintenance	48
TP 3.2 Bus Maintenance	48

TP 3.3 Transmission	49
TP 3.4 Electric Drive System Overhaul	49
TP 3.5 Fire Suppression	49
TP 3.6 Wheelchair Ramp	49
TP 3.7 Parts and Support Familiarization	49
TP 3.8 Fare Collection Device	49
TP 3.9 Advance Design Bus	49
TP 3.9.1 Destination Sign System	49
TP 3.9.2 Destination Sign System Programming	49
TP 3.9.3 Computer Aided Dispatch/Automatic Vehicle Location (CAD/AVL)	50
TP 3.9.4 Automated Voice Announcement (AVA)	50
TP 3.9.5 Automated Passenger Counting (APC)	50
TP 3.9.6 On-Board Surveillance System	50
SECTION 8: TECHNICAL SPECIFICATIONS	50
TS 1. Definitions	50
TS 2. Scope	54
TS 3. Configuration	54
TS 3.1 Transit Style Bus	54
TS 3.2 Weight	55
TS 4. Service Life	55
TS 5. Maintenance and Inspection.....	55
TS 6. Interchangeability	55
TS 7. Design Operating Environment	55
TS 8. Noise	55
TS 8.1 Interior Noise	55
TS 8.2 Exterior Noise.....	56
TS 9. Fire Safety	56
TS 10. Physical Size	56
TS 11. Underbody Clearance.....	58
TS 12. Other Clearances	58
TS 13. Interior	58
TS 13.1 Headroom	58
TS 13.2 Step	58
TS 14. Vehicle Performance	59
TS 14.1 Power Requirements	59
TS 14.2 Top Speed	59
TS 14.3 Gradability.....	59
TS 14.4 Operating Range	59
TS 14.5 Energy Storage.....	59
TS 14.6 ESS Charging	59
TS 15. Traction Motor	59
TS 16. Cooling System	60
TS 16.1 Cooling System-Electric	61
TS 16.2 Mounting	61
TS 17. Battery Cooling	61
TS 18. Regenerative Braking	62
TS 19. Mounting.....	62
TS 20. Service.....	62
TS 21. Hydraulic System	62
TS 21.1 Fluid Lines	62

TS 21.2 Fittings and Clamps.....	63
TS 22. Radiator	63
TS 23. Oil and Hydraulic Lines	63
TS 24. Labeling.....	63
TS 25. Structure	63
TS 25.1 Design	63
TS 26. Altonna Testing.....	64
TS 27. Structural Validation	65
TS 27.1 Baseline Structural Analysis.....	65
TS 27.2 Distortion	65
TS 27.3 Resonance and Vibration	65
TS 27.4 Propulsion System Compartment Bulkheads	65
TS 27.5 Crashworthiness.....	65
TS 27.6 Corrosion	66
TS 28. Towing.....	66
TS 28.1 No Provision of Glad-Hand Type Connectors for Towing	66
TS 28.2 Lift (Supported) Front Axle and Flat Towing Capability	66
TS 29. Jacking	67
TS 30. Hoisting	67
TS 31. Floor.....	67
TS 31.1 Design.....	67
TS 31.2 Bi-Level Floor Design	67
TS 31.3 Strength	67
TS 31.4 Construction	68
TS 31.5 Composite Transit Floor.....	68
TS 32. Platforms	68
TS 32.1 Drivers' Area.....	68
TS 32.2 Farebox.....	69
TS 32.3 Rear Step Area to Rear Area	69
TS 33. Wheel Housing.....	70
TS 34. Chassis.....	70
TS 34.1 Suspension.....	70
TS 34.2 Damping	70
TS 34.3 Rear Axle.....	70
TS 34.4 Springs and Shock Absorbers Travel	70
TS 34.5 Lubrication	71
TS 34.6 Kneeling	71
TS 35. Wheels and Tires.....	71
TS 35.1 Wheels	71
TS 35.2 Tires	72
TS 36. Steering	72
TS 36.1 Steering Axle.....	72
TS 37. Steering Wheel	72
TS 37.1 General.....	72
TS 37.2 Turning Effort.....	72
TS 37.3 Steering Column Tilt	73
TS 37.4 Telescopic Adjustment	73
TS 38. Rear Axle	73
TS 39. Turning Radius.....	74
TS 40. Brakes.....	74
TS 40.1 Service Brake	74

TS 40.2 Actuation	74
TS 40.3 Friction Material	74
TS 40.4 Hubs and Drums/Discs	74
TS 40.5 Parking Brake	74
TS 40.6 Emergency Brake.....	74
TS 41. Interlocks	75
TS 42. Pneumatic System.....	75
TS 42.1 General	75
TS 42.2 Air Compressor	75
TS 42.3 Air Lines and Fittings.....	75
TS 42.4 Air Reservoirs.....	76
TS 42.5 Air System Dryer	76
TS 43. Electrical, Electrical and Data Communication Systems	76
TS 43.1 Overview.....	76
TS 43.2 Modular Design	78
TS 43.3 Environmental Requirements	78
TS 43.4 Mounting Requirements	78
TS 44. General Electrical Requirement	78
TS 44.1 Low-Voltage Batteries (24V)	78
TS 44.2 Battery Cables	79
TS 44.3 Battery Compartment.....	79
TS 44.4 Auxiliary Electronic Power Supply	79
TS 44.5 Master Battery Switch.....	79
TS 44.6 Low-Voltage Generation Distribution	80
TS 44.7 Circuit Protection	80
TS 44.8 Grounds	80
TS 44.9 Low Voltage/Low Current Terminals	80
TS 44.10 Electrical Components	81
TS 44.11 Electrical Compartments	82
TS 44.12 Vehicle Charging Stations	82
TS 45. General Electronic Requirements	84
TS 45.1 Wiring and Terminal	84
TS 45.2 Discrete I/O (Inputs/Outputs)	84
TS 45.3 Shielding	84
TS 45.4 Communications	84
TS 45.5 Radio Frequency (RF).....	85
TS 45.6 Audio	85
TS 46. Multiplexing	85
TS 46.1 General	85
TS 46.2 Electrical Compartments	85
TS 46.3 I/O Signals	85
TS 47. Data Communications	86
TS 47.1 General.....	86
TS 47.2 Drivetrain Level.....	86
TS 47.3 Diagnostics, Fault Detection and Data Access	86
TS 47.4 Programmability (Software).....	86
TS 48. Multiplex Level.....	86
TS 48.1 Data Access	86
TS 48.2 Diagnostics and Fault Detection	86
TS 48.3 Programmability Software	87
TS 48.4 Electronic Noise Control	87

TS 49. Driver's Area Controls	87
TS 49.1 General	87
TS 49.2 Glare.....	87
TS 49.3 Visors/Sun Shades	88
TS 49.4 Driver Hand Controls.....	88
TS 49.5 Normal bus Operation Instrumentation and Controls.....	88
TS 49.6 Instrument Panel.....	89
TS 49.7 Driver Foot Controls.....	89
TS 49.8 Pedal Angle.....	89
TS 49.9 Pedal Dimensions and Position	89
TS 49.10 Brake and Accelerator Pedals	90
TS 49.11 Driver Foot Switches.....	90
TS 50. Driver's Amenities	90
TS 50.1 Coat Hook.....	90
TS 50.2 Storage Boxes/Garbage Bin and Bracket	90
TS 51. Windshield Wipers and Washers	91
TS 51.1 Windshield Wipers	91
TS 51.2 Intermittent Wiper and Variable Control	91
TS 51.3 Windshield Washers	91
TS 52. Driver's Seat	91
TS 52.1 Dimension.....	91
TS 52.2 Seat Pan Cushion Length	91
TS 52.3 Seat Pan Cushion Height.....	91
TS 52.4 Seat Pan Cushion Slope	91
TS 52.5 Seat Base Fore/AFT/Adjustment	91
TS 52.6 Seat Pan Cushion Width.....	92
TS 52.7 Seat Suspension.....	92
TS 52.8 Seat Back	92
TS 52.9 Seat Back Lumbar Support	92
TS 52.10 Seat Back Angle Adjustment	92
TS 52.11 Seat Belt.....	92
TS 52.12 Seat Control Locations	92
TS 52.13 Seat Structure and Materials	93
TS 53. Mirrors	93
TS 53.1 Exterior Mirrors	93
TS 53.2 Flat Mirrors on Both Sides	93
TS 53.3 Curbside Mirror	93
TS 53.4 Street-Side Mirror	93
TS 54. Windows	93
TS 54.1 General	93
TS 54.2 Windshield.....	93
TS 54.3 Glazing	94
TS 54.4 Driver's Side Window.....	94
TS 54.5 Side Windows	94
TS 55. Heating, Ventilating and Air Conditioning.....	95
TS 55.1 Capacity and Performance Requirements	96
TS 55.2 Controls and Temperature Uniformity	96
TS 55.3 Manually Adjustable Temperature Control Set Point.....	96
TS 55.4 Auxiliary Heater.....	96
TS 55.5 Passenger Area	96
TS 55.6 Driver's Area	97

TS 55.7 Controls for the Climate Control System (CCS).....	97
TS 55.8 Driver’s Compartment Requirement.....	97
TS 55.9 Air Filtration.....	98
TS 55.10 Roof Ventilation	98
TS 55.11 Maintainability.....	98
TS 55.12 Floor-Level Heating	98
TS 56. Exterior Panels.....	98
TS 56.1 Design.....	98
TS 56.2 Materials	98
TS 56.3 Pedestrian Safety.....	99
TS 56.4 Side Body Panels.....	99
TS 56.5 Rain Gutters.....	99
TS 56.6 License Plate Provisions	99
TS 56.7 Fender Skirt	99
TS 56.8 Splash Aprons	99
TS 56.9 Access Doors	99
TS 56.10 Access Door Latch/Locks	100
TS 56.11 Bumper Location.....	100
TS 56.12 Front Bumper	100
TS 56.13 Rear Bumper.....	100
TS 56.14 Bumper Material	100
TS 56.15 Bike Rack	100
TS 57. Finish and Color	100
TS 57.1 Appearance	100
TS 57.2 Decals Numbering and Signage.....	101
TS 57.3 Passenger Information	101
TS 58. Lighting	101
TS 58.1 Exterior Lighting	101
TS 58.2 Backup Light/Alarm.....	102
TS 58.3 Doorway Lighting	102
TS 58.4 Turn Signals	102
TS 58.5 Headlamps	102
TS 58.6 Exterior LED “STOP” Light	102
TS 58.7 Deceleration Lights/Brake Lights	102
TS 58.8 Service Area Lighting (Interior and Exterior)	102
TS 58.9 Interior Lighting	103
TS 58.10 Driver’s Area	103
TS 58.11 Seating Area	104
TS 58.12 Vestibules/Doors	104
TS 58.13 Step Lighting	104
TS 58.14 Ramp Lighting	104
TS 58.15 Farebox Lighting	104
TS 59. Interior Panels and Finishes	104
TS 59.1 General	104
TS 59.2 Modesty Panels	105
TS 59.3 Floor Panels	105
TS 59.4 Composite Subfloor/Covering	105
TS 59.5 Fare Collection Area	105
TS 60. Passenger Seating	106
TS 60.1 Arrangements and Seat Style	106
TS 60.2 Seats	106

TS 61. Passenger Assists	109
TS 61.1 Assists	109
TS 61.2 Front Doorway	109
TS 61.3 Vestibule	109
TS 61.4 Rear Doorways	110
TS 61.5 Overhead	110
TS 61.6 Longitudinal Seat Assists	110
TS 61.7 Wheel Housing Barriers/Assists	110
TS 62. Passenger Doors	110
TS 62.1 Accessibility Requirements	110
TS 62.2 Front Door	110
TS 62.3 Rear Door	111
TS 62.4 Materials and Construction	111
TS 62.5 Dimensions	111
TS 62.6 Door Glazing	112
TS 62.7 Door Projection	112
TS 62.8 Closing Force	112
TS 62.9 Actuators	112
TS 62.10 Emergency Operation	113
TS 62.11 Door Control	113
TS 62.12 Five-Position Driver's Door Controller	113
TS 62.13 Door Open/Close	113
TS 63. Accessibility Provisions	114
TS 63.1 Loading System	114
TS 63.2 Wheelchair Accommodations	114
TS 64. Signage and Communication	114
TS 64.1 Destination Signs	114
TS 64.2 Covert Alarms	118
TS 64.3 Automated Voice Annunciation System (AVAS)	118
TS 64.4 Vehicle Logic Unit (DR-700 Or Approved Equal)	119
TS 64.5 Audio Diagnostics	120
TS 64.6 Transit Control Head (TCH) (OCU)	120
TS 64.7 Type-N Operator Control Unit (TCH)	121
TS 64.8 GPS-Based Automatic Message Trigger	121
TS 64.9 Internal Display Sign	121
TS 64.10 Public Address Speakers	122
TS 64.11 Hands Free Microphone	122
TS 64.12 Wireless Data Transfer	122
TS 64.13 Interior Displays	123
TS 65. Passenger Stop Request/Exit Signal	123
TS 66. USB Charging	123
TS 67. Radio	123
TS 68. Special Tools and Equipment (See Pricing Exhibit E)	124
TS 69. Spare Parts (See Pricing in Attachment F)	124
TS 70. Optional Equipment (See Pricing in Exhibit D)	125
TS 70.1 Automated Fare Collection	125
TS 70.2 Automatic Passenger Counter (APC)	126
TS 70.3 Automatic Vehicle Monitoring (AVM) Module	126
TS 70.4 Digital Video Recording System	126
TS 70.5 Pedestrian Turn Warning System	127
TS 70.6 Optional Radio	127

TS 70.7 Central Recording Station	127
TS 70.8 Route Mapping Services	128
TS 70.9 Route Mapping Module	128
TS 70.10 Attachments For Technical Provisions	128
SECTION 9: ATTACHMENTS, CERTIFICATIONS, AND ASSURANCES	129
Attachment A: Bid submission Checklist	129
Attachment B: Instructions for Bidder Cover Letter	130
Attachment C: Base Bus Pricing Proposal	131
Attachment D: Pricing Schedule for Optional Equipment and Services	132
Attachment E: Pricing Schedule for Optional Special Tools	134
Attachment F: Pricing Schedule for Optional Special Tools	135
Attachment G: Bidder's Vehicle Technical Information	137
Attachment H: Comprehensive Quality Assurance Program Plan	157
Attachment I: Comprehensive Warranty Program Plan	158
Attachment J: Comprehensive Spare Parts Program Plan	159
Attachment K: Comprehensive Bas Bus and Optional Training Program Plan	160
Attachment L: Financial Capability	161
Attachment M: Bidder's References Form	162
Attachment N: Request for Clarification (RFC)	163
Attachment O: Request for Approved Equals (RAE)	164
Attachment P: Request for Deviation (RFD)	165
Attachment Q: Acknowledgment of Addenda	166
Attachment R: Bidder Questionnaire (Service, Parts & Distribution).....	167
Attachment S: Cost Analysis Information	168
Attachment T: Federal Certification Regarding Lobbying	170
Attachment U: Federal Transit Vehicle Manufacturer's (TVM) Certification	171
Attachment V: Federal Certification of Compliance or Non-Compliance with Buy	172
Attachment W: Pre-Award Certification of compliance With FMVSS Rolling Stock	173
Attachment X: Federal Certification Regarding Debarment and Suspension	174
Attachment Y: Federal Certification of compliance with Bus Testing Requirement	176
Attachment Z: Federal Requirements and Special Conditions for Rolling Stock	177
Attachment AA: Signature Page of Agreeing to All Federal Requirements	191
Attachment AB: Offer and Award	192
Attachment AC: Purchase Contract Sample	193
Attachment AD: City of Durham Equal Business Opportunity Program.....	195

Notice to Prospective Bidder

Bid No. 19-0037

The CITY OF DURHAM invites your **bid for All Electric Buses to be opened at 2:00p.m, Monday, April 15, 2019**, in the Finance Department, Purchasing Division, 1st Floor, 101 City Hall Plaza (Annex), Durham, North Carolina 27701.

The City of Durham Purchasing Division will hold a **pre-bid conference on Friday, March 15th at 10:00 a.m.**, in the GoDurham Board Room, 1907 Fay Street, Durham, North Carolina 27704.

The GoDurham facility may be viewed shortly after the pre-bid conference on March 15th, at the GoDurham Facility, 1907 Fay Street Durham, North Carolina 27704. Appointments can also be made with, Bob Losiniecki, Maintenance Manager, at (919)560-1545 x36134. All Sales representatives are encouraged to attend this pre-bid conference. Below is a copy of the Bid Proposal and Specifications. Any questions may be referred to Jonathan Hawley, Purchasing Supervisor at (919)560-4132, ext. 18225, or by email at jonathan.hawley@durhamnc.gov.

MAILING INSTRUCTIONS: Address envelope and insert bid number as shown below: It is the responsibility of the bidder to have the bid in this office by the specified time and date of opening. Our office does not take responsibility for any bids not delivered to the Purchasing Division.

DELIVERED BY US POSTAL SERVICE (REGULAR/STANDARD MAIL ONLY)	DELIVERED BY ANY OTHER MEANS/SPECIAL DELIVERY/OVERNIGHT (BY ANY OTHER CARRIER)
BID NO. 19-0037 CITY OF DURHAM FINANCE DEPARTMENT PURCHASING DIVISION 101 CITY HALL PLAZA DURHAM, NORTH CAROLINA 27701	BID NO. 19-0037 CITY OF DURHAM FINANCE DEPARTMENT PURCHASING DIVISION 101 CITY HALL PLAZA (ANNEX), 1ST FLOOR DURHAM, NORTH CAROLINA 27701

SECTION 1: NOTICE OF REQUEST FOR PROPOSALS

NR 1. Description of the Work to be Done

CITY OF DURHAM is requesting proposals from qualified firms for the provision of 30-foot, 35-foot, or 40-foot low floor all electric zero emissions fixed route vehicles with inductive charging and associated equipment with an option for 6 additional vehicles and equipment in the near future. CITY OF DURHAM has since been awarded a Federal 5339(C) grant for the purchase of these electric vehicles.

It is the desire of the CITY OF DURHAM to operate the electric bus on the following GoDurham fixed routes: **Northgate Mall/Northpoint (approximately 88 miles), NC98/The Village/East Durham (approximately 82 miles) , Hwy 54&55/Woodcroft/Southpoint Mall (approximately 87 miles), or other Trippers** as may be decided by the daily operation of the service. All other routes in the system are not recommended at this point for the initial electric bus operation. See below for GODURHAM's system wide route map.

The nominal Operating Range of a 30, 35 or 40' Battery – These Electric buses, when run on the Transit Coach Duty cycle should be at **least 150 miles** with full charge capacity after a Long Range Slow Charge.

NR 2. GoDurham System Wide Route Map



LEGEND

- Interstate
- Highway
- State Route
- Bus Route
- Route Deviation
- GoTriangle Route
- Landmark
- School/University
- Shopping
- Hospital & Medical Facility
- GoDurham Transfer Point
- GoTriangle Transfer Point
- GoRaleigh Transfer Point

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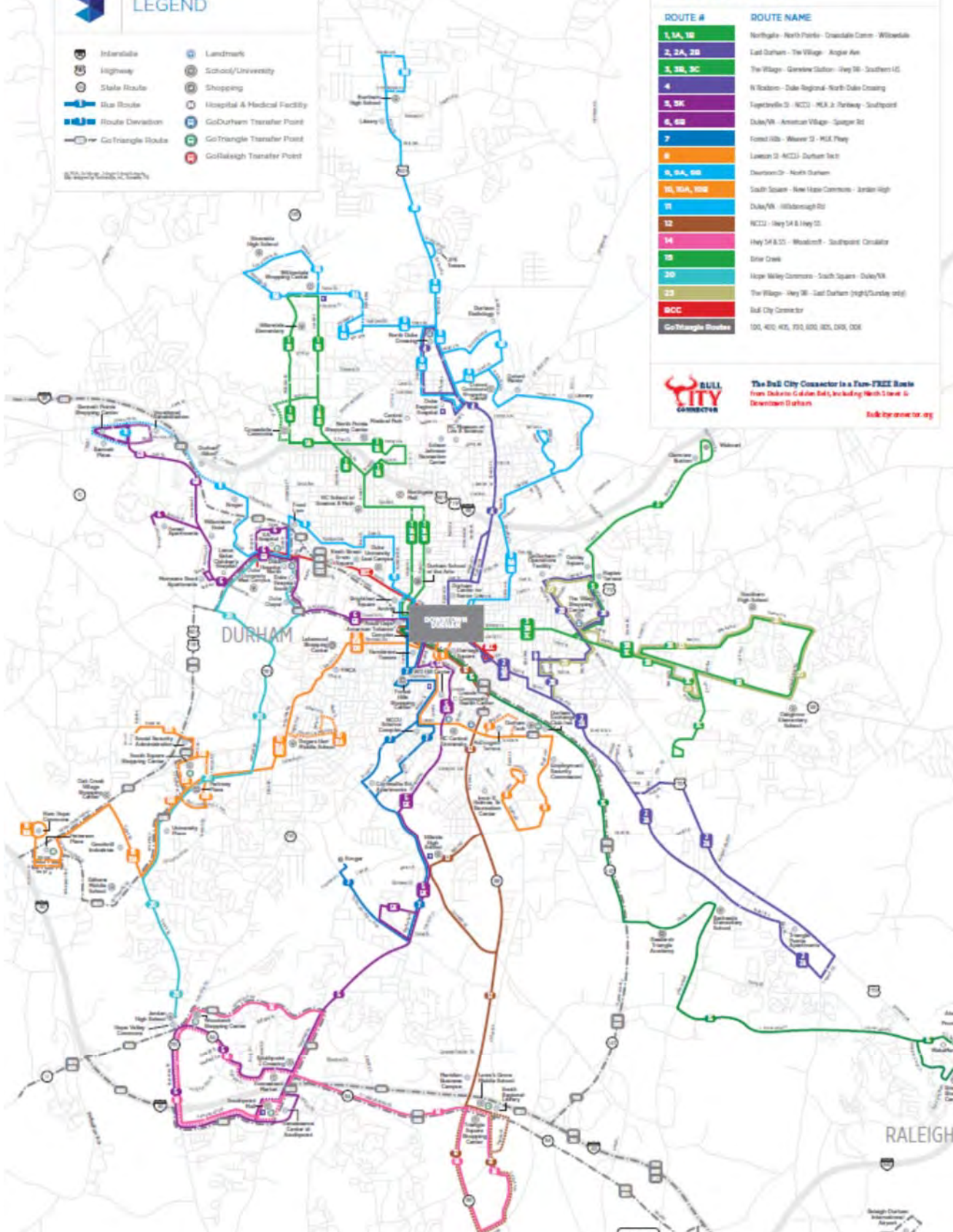
ROUTE LISTING

ROUTE #	ROUTE NAME
1, 1A, 1B	Northgate - North Pointe - Grassdale Center - Willowdale
2, 2A, 2B	East Durham - The Village - Angier Ave
3, 3B, 3C	The Village - Glenview Station - Hwy 58 - Southern Hills
4	N. Raleigh - Duke Regional - North-Duke Crossing
5, 5K	Wakefield St. - NCCU - HSA J. Parkway - Southpoint
6, 6B	Duke/VN - American Village - Spangor Rd
7	Forest Hills - Weaver St. - MSA Plaza
8	Lanesboro St. - NCCU - Durham Tech
9, 9A, 9B	Downtown Dr. - North Durham
10, 10A, 10B	South Square - New Hope Commons - Jordan High
11	Duke/VN - Hillsborough Rd
12	NCCU - Hwy 54 & Hwy 55
14	Hwy 54 & 55 - Woodcroft - Southpoint Connector
15	Erin Creek
20	Hope Valley Commons - South Square - Duke/VN
23	The Village - Hwy 58 - East Durham (high/Sunday only)
BCC	Bus City Connector
GoTriangle Routes	100, 400, 402, 700, 800, 802, 840, 806



The Bull City Connector is a **Free** Route
from Durham to Raleigh, including North Triangle
Downtown Durham

dukefornewton.org



NR 3. Proposal Due Date and Submittal Requirements

Proposals must be received by April 15, 2019 at 2:00 p.m.

1. Sealed Proposals shall be submitted to either of the following addresses:
 - a. For Or, courier delivery or hand delivery: Attention: Jonathan Hawley, 101 City Hall Plaza Annex, Durham, NC 27701 Or,
 - b. By U.S. mail
2. Envelopes or boxes containing Proposals shall be sealed and clearly labeled with the Agency's solicitation title: All Electric Buses for CITY OF DURHAM Transit.
3. Proposers are requested to submit to the Agency one hard copy marked "Original," two additional printed copies, and two CDs, or flash drives containing an electronic PDF copy of the Proposal. In case of any discrepancies, the hard copy will be considered by the Agency in evaluating the Proposal, and the electronic version is provided for the Agency's administrative convenience only. A Proposal is deemed to be late if it is received by the Agency after the deadline stated above. Proposals received after the submission deadline may be rejected.

NR 4. Validity of Proposals

Proposals and subsequent offers shall be valid for a period 90 days.

NR 5. Pre-Proposal Meeting Information (Optional)

A Pre-Proposal Meeting will be held **on March 15, 2019**. The meeting will convene **at 10:00 a.m.in the Fay Street Main Conference Room located at 1907 Fay Street, Durham, NC 27704**. Although this Pre-Proposal Meeting is optional, Prospective Proposers are strongly encouraged to be present. There will be a walk through of the facility in general, including the charging stations.

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

Contracting Officer's Contact Information:

Name: Pierre Osei-Owusu

Title: Transit Administrator

Address: 1907 Fay Street
Durham, NC 27704

Phone number: 919-560-1535 ext. 36214

Pierre.Osei-Owusu@durhamnc.gov

Fax number: 919-560-1534

Identification of Source of Funding

Financial support of this project is provided through financial assistance grants from the Federal Transit Administration (FTA), State of North Carolina (NCDOT) and The City of Durham.

SECTION 2: INSTRUCTIONS TO PROPOSERS

IP 1. Quantities

The work under these contract documents consists of the manufacture and delivery of a base order depending on pricing, of a minimum of three low-floor all electric 30,35 or 40-foot transit buses and associated equipment (chargers, inductive charging equipment), spare parts, training materials and manuals.

There will be future options for 6; 30,35 or 40-foot low-floor all electric transit buses and associated equipment (chargers, inductive charging equipment), spare parts, training materials and manuals for the future.

IP 2. Proposed Schedule for the Procurement

The following is the solicitation schedule for Proposers:

- Pre-Proposal Meeting: March 15, 2019 at 10:00 a.m.
- Proposer communications and questions answered: March 22, 2019 at 5 p.m.
- Proposal Due Date: April 15, 2019 at 2:00 p.m.

IP 3. Pre-Proposal Meeting/Information for Proposers

A Pre-Proposal Meeting will be held on March 15, 2019. The meeting will convene at 10:00 a.m. in the Main Conference Room at 1907 Fay Street Durham, NC 27704. Prospective Proposers are strongly encouraged to be present. There will be a walk through for the facility in general, including the charging stations.

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

IP 4. Questions, Clarifications and Omissions

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

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

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

clarification to the Agency within the time period specified above.

IP 5. Addenda to RFP

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

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

IP 6. DBE Requirements for Transit Vehicle Manufacturers

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

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 15 days from the receipt of each payment the prime contractor receives from CITY OF DURHAM. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractor’s work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of CITY OF DURHAM. This clause applies to both DBE and non-DBE subcontractors.

Sanctions/consequences of noncompliance with the prompt payment clause may include:

1. Requiring documentation of all payment to subcontractors for all previous payments from CITY OF DURHAM to the prime contractor before any future payments from CITY OF DURHAM to the prime contractor are made.
2. Termination of contract for Default
3. Inability of prime contractor to bid on any future CITY OF DURHAM contracts.

CITY OF DURHAM will ensure that the prompt payment clause of the contract is enforced by:

1. Requiring prime contractors (in sub-contracts in excess of \$10,000, to provide subcontractors with all contract provisions, including the prompt payment provision.) Essentially, ensuring that subcontractors are knowledgeable of the prompt payment requirement.
2. Informing contractors at the pre-construction meeting that CITY OF DURHAM will be monitoring the prompt payment clause of the contract by requiring the subcontractors to file a final certified payroll report upon completion of a subcontractor’s portion of the contracted work. After the final certified payroll report has been filed, CITY OF DURHAM will send a letter via e-mail to the subcontractor to verify that the subcontractor has received prompt payment of what is owed from the prime contractor, including retainage.

3. If CITY OF DURHAM is contacted by a subcontractor regarding possible violation of the prompt payment clause by the prime contractor we will make inquiries to the prime contractor. Depending on the response from the prime contractor, CITY OF DURHAM may implement the sanctions/consequences listed in the above section.

IP 7. Buy America Certification

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

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

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

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

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

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

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

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

Any party may petition the FTA to investigate a successful Proposer’s compliance with the Buy America certification. The procedures are set out in 49 CFR Part 661.15. If the FTA determines that the evidence indicates

noncompliance, the FTA will require the Agency to initiate an investigation. The successful Proposer has the burden of proof to establish compliance with its certification. If the successful Proposer fails to so demonstrate compliance, then the successful Proposer will be required to substitute sufficient domestic materials without revision of the original Contract terms. Failure to do so will be a breach of the Contract and may lead to the initiation of debarment proceedings under 49 CFR Part 29.

IP 8. Conditions, Exceptions, Reservations or Understandings

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

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

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

IP 9. Protest Procedures

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

IP 9.1 Address

All protests must be addressed as follows:

- Agency contact: Jonathan Hawley
- For special delivery or hand delivery: 101 City Hall Plaza Annex, Durham, NC 27701
- For U.S. mail: 101 City Hall Plaza Annex, Durham, NC 27701

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

Copies of the Agency's protest procedures and the protest provisions of FTA Circular 4220.1 For its successor may be obtained from Jonathan Hawley, CITY OF DURHAM, 101 City Hall Plaza Annex, Durham, NC. Proposals will be opened and a Notice of Award will be issued by the Agency in accordance with the Agency's protest procedures and the protest provisions of FTA Circular 4220.1 For its successor.

IP 9.2 Pre-Proposal Protests

Pre-Proposal protests are protests based upon the content of the solicitation documents. Three copies of Pre-Proposal protests must be received by the Agency's office no later than ten (10) calendar days prior to the Due Date. Protests will be considered and either denied or sustained in part or in whole, in writing, in a manner that provides verification of receipt, prior to the Due Date for Proposals. A written decision specifying the grounds for sustaining all or part of or denying the protest will be transmitted to the protestor prior to the Due Date for Proposals in a manner that provides verification of receipt prior to the Due Date for Proposals. If the protest is sustained, then the Proposal Due Date may be postponed and an addendum issued to the solicitation documents or, at the sole discretion of the Agency, the solicitation may be canceled. If the protest is denied, then Proposals will be received and opened on the scheduled date unless a protest is filed with FTA. See "FTA Review," below.

IP 9.3 Protests on the Recommended Award

All Proposers will be notified of the recommended award. This notice will be transmitted to each Proposer at the address contained in its Proposal form in a manner that provides verification of receipt. Any Proposer whose Proposal has not lapsed may protest the recommended award on any ground not specified in “Pre-Proposal Protests,” above. Three (3) copies of a full and complete written statement specifying in detail the grounds of the protest and the facts supporting the protest must be received by the Agency at the appropriate address in “Address,” above, no later than ten (10) calendar days after the date such notification is received. Prior to the issuing of the Notice of Award, a written decision stating the grounds for allowing or denying the protest will be transmitted to the protestor and the Proposer recommended for award in a manner that provides verification of receipt.

IP 9.4 FTA Review

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

IP 10. Preparation of Proposals

IP 10.1 Use of Proposal Forms

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

IP 10.2 Proposal Format Requirements

Proposals shall be submitted in three 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.

Proposers shall submit one original (marked clearly as such), two hard copies, and two CDs or two flash drives, each containing an electronic PDF copy of the Proposal to the Agency. In case of any discrepancies, the original will be considered by the Agency in evaluating the Proposal, and the electronic version is provided for the Agency’s administrative convenience only.

The hard-copy Proposals 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 × 17in. 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.

Package 1: Technical Proposal Requirements

1. Letter of Transmittal
2. Technical Proposal
3. Acknowledgement of Addenda
4. Contractor Service and Parts Support Data
5. Form for Proposal Deviation (without price data)
6. Vehicle Questionnaire
7. References and Non-Priced Information
8. Engineering organization chart, engineering change control procedure, field modification process
9. Manufacturing facilities plant layout, other contracts, staffing
10. Federal Certificates and all Required Attachment and Signature pages

11. Production and delivery schedule and other Contract commitments for the duration of this Contract
12. Management Plan
13. Proposed delivery date not to exceed 12 months after Contract Award

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 option buses, spare parts package, manuals, training, special tools and test equipment)

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

Package 3: Qualification Package Requirements

1. Pre-Award Federal Evaluation Forms
2. A copy of the three (3) most recent financial statements audited by an independent third party or a statement from the Proposer regarding how financial information may be reviewed by the Agency
3. Letter for insurance, indicating the Contractor's ability to obtain the insurance coverage in accordance with the RFP requirements
4. Letter from a surety for a Performance Guarantee, if required, indicating the Contractor's ability to obtain financial guarantees in accordance with the RFP requirements
5. Form for Proposal Deviation, if applicable (without price data)
6. Proposal Form
7. 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

Package 4: Proprietary/Confidential Information Package Requirements

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

The Proposer is advised that the Agency is public 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 the Agency 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 and hold harmless the Agency from any legal action arising from such a declaration.

IP 10.3 Signing of Proposal Forms

Proposals shall include firm name (and, in the event that the Proposer is a joint venture, the names of the individual firms comprising the joint venture); business address; and the name, title, business address, telephone number, 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 the Agency. The Proposer shall submit with its Proposal a copy of the joint venture agreement.

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

IP 10.4 Modification or Withdrawal of Proposals

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

IP 11. Proposal Evaluation, Negotiation and Selection

Proposals will be evaluated, negotiated, selected and any award made in accordance with the criteria and procedures described below. The approach and procedures are those applicable to a competitive negotiated procurement whereby Proposals are evaluated to determine which Proposals are within a Competitive Range.

This procurement will be conducted using competitive proposal procedures. It is the intent of the City of Durham to conduct technical evaluations of proposals received, hold vendor interviews, conduct negotiations with one or more vendors, and select a vendor, with the goal of promoting fairness and competition. The following criteria will be used to evaluate the proposals:

- a) Cost
- b) Responsiveness of the technical proposal to the requirements stated in the RFP
- c) Experience and qualifications
- d) References

IP 11.1 Evaluation Committee

An Evaluation Committee, which will include officers, employees and agents of the Agency, will be established. The Evaluation Committee will carry out the detailed evaluations, including establishing the Competitive Range, carrying out negotiations and making the selection of the Proposer, if any, that may be awarded the Contract.

IP 11.2 Review of Proposals for Responsiveness and Proposers for Responsibility

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

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

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

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

IP 11.3 Proposal Selection Process

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

IP 11.4 Evaluation Procedure

THE TOTAL NUMBER OF POINTS USED TO SCORE THIS CONTRACT IS 100

This procurement will be conducted using competitive proposal procedures. It is the intent of the City of Durham to conduct technical evaluations of proposals received, hold vendor interviews, conduct negotiations with one or more vendors, and select a vendor, with the goal of promoting fairness and competition.

The Purchasing Coordinator shall appoint a Selection Committee to evaluate and determine which proposals are responsive and will rank them according to the evaluation criteria. The Committee shall make its findings to and award recommendations to the city council. The council shall award all competitive proposal contracts to the responsible firm whose proposal is most advantageous considering price and technical requirements.

Proposals received will first be reviewed for completeness and inclusion of the information requested in the Request for Proposal. The absence of required information may result in exclusion from further consideration. The following criteria will be used to evaluate the proposals.

Cost	40%
Responsiveness of the technical proposal to the requirements stated in the RFP	20%
Experience and Qualifications	20%
References	20%

IP 11.5 Evaluations of Competitive Proposals

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

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

Rankings of the Proposals against the evaluation will then be made for determining which Proposals are within the Competitive Range, or may reasonably be made to be within the Competitive Range.
3. **Proposals not within the Competitive Range.** Proposers of any Proposals that have been determined by the Agency as not in the Competitive Range, and that cannot be reasonably made to be within the Competitive Range, will be notified in accordance with the Agency’s policies.
4. **Discussions with Proposers in the Competitive Range.** The Proposers whose Proposals are found by the Agency to be within the Competitive Range, or that may be reasonably made to be within the Competitive Range, will be notified and any questions or requests for clarifications provided to them in writing. Each such Proposer may be invited for an interview and discussions with the Agency to discuss answers to written or oral questions, clarifications and any facet of its Proposal.

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

No information, financial or otherwise, will be provided to any Proposer about any of the Proposals from other Proposers, to the extent permitted by applicable law. Proposers will not be given a specific price or specific financial requirements they must meet to gain further consideration, except that proposed prices may be considered to be too high with respect to the marketplace or unacceptable. Proposers will not be told of their rankings among the other Proposers prior to Contract award.

5. **Factory and site visits.** The Agency reserves the right to conduct factory visits of the Proposer’s facilities and/or the facilities of major sub-suppliers included in the Proposal.
6. **Debriefing.** Subsequent to the award, the unsuccessful Proposers will be notified and may request a debriefing. Proposers will be debriefed in accordance with Agency policies, including information regarding the shortcomings of their Proposal.

IP 12. Response to Proposals

IP 12.1 Single Proposal Response

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

IP 12.2 Availability of Funds

This procurement is subject to the availability of funding. CITY OF DURHAM has received a Transit Investments for Greenhouse Gas and Energy Reduction grant which requires the use of inductive charging as specified in the grant application.

IP 12.3 Agency Contract Approval Process

Upon completion of its evaluation process, City of Durham will recommend the most competitive Proposer to City council for approval. Upon approval, by city Council, City of Durham will provide notice to all parties as to the result of the evaluation and notice of award. The Proposer who is awarded the contract will receive a draft copy of the contract (sample copy attached). Upon execution of the contract, CITY OF DURHAM will issue a purchase order.

IP 12.4 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 ten calendar days after the date of receipt of the notice of award. Failure to fulfill these requirements within the specified time is cause for termination of the Contract under "Termination for Default" in Section 3.

SECTION 3: General Conditions

GC 1. 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 the Agency, 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.

GC 2. 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. Notwithstanding the provision of drawings, technical specifications or other data by the Agency, the Contractor shall have the responsibility of supplying all parts and details required to make the 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 the Agency 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 3. Inspection, Testing and Acceptance

GC 3.1 General

The Agency'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 the Agency 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.

Within thirty (30) calendar days after arrival at the designated point of delivery, the bus shall undergo the Agency tests defined in "Post-Delivery Tests." If the bus passes these tests or if the Agency does not notify the Contractor of non-acceptance within 30 calendar days after delivery, then acceptance of the bus by the Agency occurs on the 30th day after delivery. If the bus fails these tests, it shall not be accepted until the repair procedures defined in "Repairs after Non-Acceptance" have been carried out and the bus retested until it passes. Acceptance occurs earlier if the Agency notifies the Contractor of early acceptance or places the bus in revenue service.

GC 3.2 Risk of Loss

The Agency 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 it shall be delivered to the Agency 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 4. Title and Warranty of Title

Adequate documents for registering the bus in the state of North Carolina shall be provided to the Agency not less than 10 business days before delivery to the Agency. Upon acceptance of each bus, the Contractor warrants that the title shall pass to the Agency free and clear of all encumbrances.

GC 5. Intellectual Property Warranty

The Agency shall advise the Contractor of any impending patent suit related to this Contract against the Agency and provide all information available. The Contractor shall defend any suit or proceeding brought against the Agency 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 the Agency. 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 the Agency 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 the Agency shall hold the Contractor harmless with respect to the equipment or part if it was specified by the Agency and all requests for substitutes were rejected, and the Contractor advised the Agency under "Questions, Clarifications and Omissions" of a potential infringement, in which case the Contractor shall be held harmless.

GC 6. Data Rights

GC 6.1 Proprietary Rights/Rights in Data

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

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

The Agency 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 the Agency to utilize such information in order to maintain the vehicles. In the event that the Contractor no longer provides the information, the Agency has the right to reverse engineer patented parts and software.

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

GC 6.2 Access to Onboard Operational Data

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

GC 7. Changes

GC 7.1 Contractor Changes

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

GC 7.2 Agency Changes

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

GC 8. Legal Clauses

GC 8.1 Indemnification

GC 8.1.1 The Contractor shall, to the extent permitted by law:(1) protect, indemnify and save the Agency 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 the Agency 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 the Agency 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. The Agency 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. The Agency 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. The Agency shall have the right to be represented therein by advisory council of its own selection at its own expense.

GC 8.1.2 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 the Agency, 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 8.2 Suspension of Work

GC 8.2.1 The Agency may at any time and for any reason within its sole discretion issue a written order to the Contractor suspending, delaying or interrupting all or any part of the Work for a specified period of time.

GC 8.2.2 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 the Agency.

GC 8.2.3 The Contractor shall be allowed an equitable adjustment in the Contract price (excluding profit) and/or an extension of the Contract time, to the extent that cost or delays are shown by the Contractor to be directly attributable to any suspension. However, no adjustment shall be made under this section for any suspension, delay or interruption due to the fault or negligence of the Contractor, or for which an equitable adjustment is provided for, or excluded under any other term or condition of the Contract. As soon as reasonably possible but no later than forty-five (45) calendar days, or any other period of time agreed to by the parties, after receipt of the written suspension of work notice, the Contractor shall submit to the Contracting Officer a detailed price and schedule Proposal for the suspension, delay or interruption.

GC 8.3 Excusable Delays/Force Majeure

GC 8.3.1 If the Contractor is delayed at any time during the progress of the Work by the neglect or failure of the

Agency or by a cause as described below, then the time for completion and/or affected delivery date(s) shall be extended by the Agency subject to the following cumulative conditions:

- a. The cause of the delay arises after the Notice of Award and neither was nor could have been anticipated by the Contractor by reasonable investigation before such award. Such cause may also include force majeure events such as any event or circumstance beyond the reasonable control of the Contractor, including but not limited to acts of God; earthquake, flood and any other natural disaster; civil disturbance, strikes and labor disputes; fires and explosions; war and other hostilities; embargo; or failure of third parties, including Suppliers or Subcontractors, to perform their obligations to the Contractor;
- b. The Contractor demonstrates that the completion of the Work and/or any affected deliveries will be actually and necessarily delayed;
- c. The Contractor has taken measures to avoid and/or mitigate the delay by the exercise of all reasonable precautions, efforts and measures, whether before or after the occurrence of the cause of delay; and
- d. The Contractor makes written request and provides other information to the Agency as described in paragraph GC 9.3.4 below.

A delay in meeting all 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 8.3.2 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 8.3.3 The Agency reserves the right to rescind or shorten any extension previously granted, if subsequently the Agency determines that any information provided by the Contractor in support of a request for an extension of time was erroneous; provided, however, that such information or facts, if known, would have resulted in a denial of the request for an excusable delay. Notwithstanding the above, the Agency will not rescind or shorten any extension previously granted if the Contractor acted in reliance upon the granting of such extension and such extension was based on information that, although later found to have been erroneous, was submitted in good faith by the Contractor.

GC 8.3.4 No extension or adjustment of time shall be granted unless: (1) written notice of the delay is filed with the Agency within fourteen (14) calendar days after the commencement of the delay and (2) a written application therefore, stating in reasonable detail the causes, the effect to date and the probable future effect on the performance of the Contractor under the Contract, and the portion or portions of the Work affected, is filed by the Contractor with the Agency within thirty (30) calendar days after the commencement of the delay. No such extension or adjustment shall be deemed a waiver of the rights of either party under this Contract. The Agency shall make its determination within thirty (30) calendar days after receipt of the application.

GC 8.4 Termination

GC 8.4.1 Termination for Convenience

The performance of Work under this Contract may be terminated by the Agency in accordance with this clause in whole, or from time to time in part, whenever the Contracting Officer shall determine that such termination is in the best interest of the Agency. 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 Contracting Officer, 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 the Agency in the manner, at the times, and to the extent directed by the Contracting Officer, all of the right, title and interest of the Contractor under the orders and subcontracts so terminated, in which case the Agency shall have the right, in its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts.
- Settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts, with the approval or ratification of the Contracting Officer, to the extent he or she may require, which approval or ratification shall be final for all the purposes of this clause.
- Transfer title to the Agency and deliver in the manner, at the times and to the extent, if any, directed by the Contracting Officer the fabricated or unfabricated parts, Work in process, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated, and the completed or partially completed plans, drawings, information and other property which, if the Contract had been completed, would have been required to be furnished to the Agency.
- Use its best efforts to sell, in the manner, at the times, to the extent, and at the price(s) directed or authorized by the Contracting Officer, any property of the types referred to above, provided, however, that the Contractor shall not be required to extend credit to any purchaser, and may acquire any such property under the conditions prescribed by and at prices approved by the Contracting Officer, and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Agency to the Contractor under this Contract or shall otherwise be credited to the price or cost of the Work covered by this Contract or paid in such other manner as the Contracting Officer may direct.
- Complete performance of such part of the Work as shall not have been terminated by the notice of termination.
- Take such action as may be necessary, or as the Contracting Officer may direct, for the protection or preservation of the property related to this Contract that is in the possession of the Contractor and in which the Agency has or may acquire an interest.

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

GC 8.4.2 Termination for Default

The Agency 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 Contracting Officer may authorize in writing, after receipt of notice from the Contracting Officer specifying such failure.

If the Contract is terminated in whole or in part for default, the Agency may procure, upon such terms and in such manner as the Contracting Officer may deem appropriate, supplies or services similar to those so terminated. The

Contractor shall be liable to the Agency for any excess costs for such similar supplies or services and shall continue the performance of this Contract to the extent not terminated under the provisions of this clause.

Except with respect to defaults of Subcontractors, the Contractor shall not be liable for any excess costs if the failure to perform the Contract arises out of a cause beyond the control and without the fault or negligence of the Contractor. If the failure to perform is caused by the default of a Subcontractor, and if such default arises out of causes beyond the control of both the Contractor and Subcontractor, and without the fault or negligence of either of them, 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 the Agency shall be at the Contract price. The Agency may withhold from amounts otherwise due the Contractor for such completed supplies such sum as the Contracting Officer determines to be necessary to protect the Agency 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 the Agency.

GC 8.5 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 the Agency and FTA that funds any part of this Contract, as they may be amended or promulgated from time to time during the term of this Contract. Contractor's failure to so comply shall constitute a material breach of this Contract.

GC 8.6 Changes of Law

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

GC 8.7 Governing Law and Choice of Forum

This Contract shall be governed by the laws of the State of North Carolina without regard to conflict of law rules. The Contractor consents to the jurisdiction of the identified state, County of Durham.

GC 8.8 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 Contracting Officer'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. **Alternatives disputes resolution.** If agreed to by both parties, disputes may be resolved by a mutually agreed-to alternative dispute resolution process that may include structured negotiations different from paragraph 2 above, mediation or arbitration.

GC 8.9 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 the Agency is the FTA recipient or a sub-grantee of the FTA recipient, the Contractor agrees to provide the Agency, FTA, the Comptroller General of the United States, the Secretary of the U.S. Department of Transportation, the State of Tennessee or any of their duly authorized representatives access to any books, documents, papers and records of the Contractor that are directly pertinent to or relate to this Contract (1) for the purpose of making audits, examinations, excerpts and transcriptions and (2) when conducting an audit and inspection.

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

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

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

GC 8.10 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 8.11 Amendment and Waiver

GC 8.11.1 Amendment

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

GC 8.11.2 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 8.12 Remedies Not Exclusive

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

GC 8.13 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 8.14 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 8.15 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 8.16 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 8.17 Independent Parties

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

SECTION 4: SPECIAL PROVISIONS

NOTE: This section should be customized to meet the Agency's specific requirements for each individual project or Contract, as well as local and state requirements. The special provisions are intended to amend and supplement the General Conditions to meet the individual requirements of each project. These provisions should be considered as guidance and be modified, added to or deleted by the Agency, as appropriate.

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 the Agency of failure of acceptance tests. The Agency shall make the bus available to complete repairs timely with the Contractor repair schedule.

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

SP 1.1.2 Repairs by the Agency

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

1. **Parts used.** If the Agency performs the repairs after non-acceptance of the bus, it shall correct or repair the Defect and any Related Defects using Contractor-specified parts available from its own stock or those supplied by the Contractor specifically for this repair. Reports of all repairs covered by this procedure shall be submitted by the Agency to the Contractor for reimbursement or replacement of parts monthly, or at a period to be mutually agreed upon. The Contractor shall provide forms for these reports.
2. **Contractor-supplied parts.** If the Contractor supplies parts for repairs being performed by the Agency after non-acceptance of the bus, then these parts shall be shipped prepaid to the Agency.
3. **Return of defective components.** The Contractor may request that parts covered by this provision be returned to the manufacturing plant. The total costs for this action shall be paid by the Contractor.
4. **Reimbursement for labor.** The Agency shall be reimbursed by the Contractor for labor. The amount shall be determined by the Agency for a qualified mechanic at a straight time wage rate of \$32 per hour, which includes fringe benefits and overhead adjusted for the Agency's most recently published rate in effect at the time the Work is performed, plus the cost of towing in the bus, if such action was necessary. These wage and fringe benefits rates shall not exceed the rates in effect in the Agency's service garage at the time the Defect correction is made.
5. **Reimbursement for parts.** The Agency shall be reimbursed by the Contractor for defective parts that must be replaced to correct the Defect. The reimbursement shall include taxes where applicable and fifteen (15) percent handling costs.

SP 1.2 First Article Inspection – Production

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

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

SP 1.3 Post-Delivery Tests

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

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

SP 1.4 Repairs after Non-Acceptance

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

SP 2. Deliveries

SP 2.1 Bus Delivery

Delivery of buses shall be determined by signed receipt of the Agency's designated agent(s), Pierre Osei-Owusu, Transit Administrator GODURHAM, 1907 Fay Street, Durham, NC 27704, at the following point(s) of delivery and may be preceded by a cursory inspection of the bus: 1820 North Miami Blvd, Durham, NC 27704.

SP 2.2 Delivery Schedule

The buses shall be delivered at a rate not to exceed one (1) bus per week. Delivery shall be completed within 15 months after delivery of the executed Contract documents. Hours of delivery shall be between 8 a.m. and 4 p.m. on the following days of the week: Monday through Friday.

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 note the last acceptable date for receipt of Contract deliverables. The Agency will consider early receipt of Contract deliverables on a case-by-case basis. The reference section designates the appropriate specification section(s) where the requirement is referenced.

NOTE: [Table 1](#) below provides a sample list of Contract deliverables. This list should be adapted by the Agency to reflect the Contract deliverables required by the Contract specifications.

TABLE 1
Contract Deliverables

Deliverable		Agency Action	Reference Section	Due Date	Format	Quantity Due
1.	Bus Testing— Altoona Test Report	Review		Prior to bus delivery	Hardcopy	1
2.	List of serialized units installed on each bus	Review		With each delivered bus	Electronic media	1 per bus
3.	Copy of Manufacturers' formal Quality Assurance Program	Review		Pre-award site visit	Hardcopy	1
4.	QA manufacturing certificate	Review		With each delivered bus	Hardcopy	1 per bus
5.	QA purchasing certifications acknowledging receipt of applicable specification	Review		30 days following first Pre-Production Meeting	Hardcopy	1 per major Supplier
6.	Pre-Delivery Bus Documentation Package	Review		With each delivered bus	Hardcopy	1 per bus
8.	Pre-Production Meeting minutes	Approval		30 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		10 days prior to bus delivery	Hardcopy	1 per bus
11.	Performance bond	Review		30 days following execution of Contract	Hardcopy	1
12.	Insurance certificates	Approval		Before Work commences	Hardcopy	1
13.	Engineering support	Review		During Pre-Production Meeting	Contracts	1
14.	Training instructor information	Approval		30 days prior to delivery of first bus		
15.	Training curriculum	Approval		30 days prior to delivery of first bus	Electronic media	
16.	Teaching materials	Review		During classroom instruction	Hardcopy	1
17.	Professionally prepared mechanics' "Bus Orientation" training video	Review		30 days prior to first production bus	Electronic Media	20 each
18.	Final preventative maintenance manuals	Review		90 days after Agency written approval	Hardcopy Electronic media	10/100 buses 20
19.	Final diagnostic procedures manuals	Review		90 days after Agency written approval	Hardcopy Electronic media	10/100 buses 20
20.	Final parts manuals	Approval		90 days after Agency written approval	Hardcopy Electronic media	10/100 buses 20

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
21.	Component repair manuals (Agency approval/review period of 90 days from date of receipt)	Approval		90 days after Agency written approval of OEM component repair list	Hardcopy Electronic media	2 2
22.	Draft preventative maintenance manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With first bus	Hardcopy	10
23.	Draft diagnostic procedures manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With first bus	Hardcopy	10
24.	Draft parts manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With first bus	Hardcopy	10
25.	List of OEM component repair manuals	Approval		With first bus	Hardcopy	10
26.	Draft operators' manuals (Agency approval/review period of 90 days from date of receipt)	Approval		With first bus or maximum of 30 days prior to start of production	Hardcopy	10
27.	Final operators' manuals	Review		30 days following Agency approval of draft manual	Hardcopy	1 per bus
28.	Recommended spare parts list, including bill of materials	Review		60 days prior to shipment of first bus	Hardcopy	1
29.	Part number index	Approval		60 days prior to shipment of first bus	Hardcopy Spreadsheet	1 1
30.	Current price list	Review		90 days after Agency written approval of draft parts manual	Hardcopy	20
31.	In-process drawings	Review		30 days prior to production	Scale drawings	1
32.	Electrical and air schematics	Review		30 days prior to production	Hardcopy	1
33.	As-built drawings	Review		Within 60 days after final bus delivery	Electronic media	1
34.	Material samples	Review		By conclusion of Pre-Production Meetings		1
35.	Undercoating system program	Approval		First Pre-Production Meeting	Hardcopy	1
36.	Flooring certificate	Review		First Pre-Production Meeting	Certificate/ copy of purchase order	1
37.	Interior features – fire-resistance certificates	Review		Prior to first bus completion	Certificates	1
38.	Crashworthiness	Review		Pre-award audit	Certificate	1

TABLE 1
Contract Deliverables

	Deliverable	Agency Action	Reference Section	Due Date	Format	Quantity Due
39.	Technical review of electronic functionality	Approval		Prior to production	Hardcopy	1
40.	Interior security camera layout	Approval		Prior to first bus completion	Copies of interior views	1 each
41.	Technical review of powerplant			Prior to production		
42.	Powerplant certifications	Review		Prior to first bus completion	Hardcopy	1 each
43.	Striping layout	Approval		Prior to production	Hardcopy	1
44.	Resolution of issues "subject to Agency approval"	Approval		Prior to production	Hardcopy	1

SP 3. Options and Option Pricing

The Contractor hereby grants the Agency and any permissible assignee options ("Options") to purchase up to six additional vehicles ("Option Vehicles"). The Options shall be valid for a period of five years from the effective date of the Contract. There shall be no minimum order quantity for any permissible assignee. Subject to the Agency's right to order modifications, the Option Vehicles shall have the same specifications as the vehicles purchased under this Contract. The Agency may exercise the Options by written notice to the Contractor ("Notice of Exercise of Option") at any time on or before five years following the effective date of the Contract ("Option Date").

The price of the Option Vehicles shall be the unit price of the base order vehicles, ("Base Order Price") adjusted by multiplying the base order price by the following fraction:

$$\frac{\text{Latest Published Preliminary Index Number Prior to Notice of Exercise of Option} / \text{Index Number on Effective Date of the Contract}}{}$$

The Index shall be the Producer Price Index for Truck and Bus Bodies, Series No. 1413, published by the United States Department of Labor, Bureau of Labor Statistics, or if such Index is no longer in use, then such replacement that is most comparable to the Index as may be designated by the Bureau of Labor Statistics, or as agreed by the parties.

Within thirty (30) days after delivery of the Notice of Exercise of Option to the Contractor, the Contractor shall submit a proposed delivery schedule. Along with the proposed delivery schedule, the Contractor will provide the Agency with access to its production schedule for the purpose of the parties verifying available production capacity. The production schedule shall include a reasonable time for mobilization and for coordinating with other vehicle orders, and it shall be based upon a production rate at least equal to the production rate actually realized with respect to the base order vehicles. If the parties are unable to agree on a production schedule, then the maximum term for the production of the Option Vehicles shall not exceed a total of 12 months after the date of Notice to Proceed with Option Vehicle production. The Agency or any permissible assignee may issue a Notice to Proceed at any time after the Contractor submits its proposed delivery schedule. The Contractor shall not commence production of the Option Vehicles prior to issuance of the Notice to Proceed by the Agency or any permissible assignee of the Agency for the Option Vehicles incorporating the agreed production delivery schedule or the 12 month maximum term.

Except as otherwise specially provided in this Contract, all other terms of the Contract shall apply to the Option Vehicles.

SP 4. Assignability of Options

If the Agency does not exercise the option(s) as listed in “Options and Option Pricing,” then the Agency reserves the right to assign the option(s) to other grantees of FTA funds in accordance with FTA Circular 4220.1F or its successors.

SP 5. Payment

The Agency 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

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

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

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

The Agency shall make a final payment for all withholding within 30 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. Contractor provision of any certifications as required by law and/or regulations.
3. Completion of post-delivery audits required under the Contract.

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

SP 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. The Contractor will maintain auditable records, subject to the Agency 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” or any extension thereof, the Agency 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 the Agency shall be fixed at \$150 per business day per bus not delivered in substantially good condition as inspected by the Agency at the time released for shipment.

The Contractor hereby agrees to pay the aforementioned amounts as fixed, agreed and liquidated damages, and not by way of penalty, to the Agency and further authorizes the Agency 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 the Agency the difference or the entire amount, whichever may be the case, within thirty (30) days after receipt of a written demand by the Contracting Officer.

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 the Agency arising at any time from the failure of the Contractor to fulfill the obligations referenced in this clause in a timely manner.

The total amount of such liquidated damages shall not exceed ten (10) percent of the total Contract amount.”

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

SP 7.2 Documentation

The Contractor shall provide an electronic copy and 2 per bus printed current maintenance manual(s) to include preventative maintenance procedures, diagnostic procedures or troubleshooting guides and major component service manuals, an electronic copy and 1 per bus printed current parts manual(s), and an electronic copy and 2 per bus printed standard operator’s manual(s) as part of this Contract. The Contractor also shall exert its best efforts to keep maintenance manuals, operator’s manuals and parts books up to date for a period of fifteen (15) years. The supplied manuals shall incorporate all equipment ordered on the buses covered by this procurement. In instances where copyright restrictions or other considerations prevent the Contractor from incorporating major components information into the bus parts and service manuals, separate manual sets as published by the subcomponent Supplier will be provided.

SP 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 twelve (12) years after the date of acceptance. Parts shall be interchangeable with the original equipment and shall be manufactured in accordance with the quality assurance provisions of this Contract. Prices shall not exceed the Contractor’s then-current published catalog prices.

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

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

SP 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 the Agency to the Contractor for incorporation in the Work, the following provisions shall apply:

The Agency shall furnish the equipment, goods or materials in a timely manner so as not to delay Contract delivery or performance dates. If Agency-furnished property is received in a condition not suitable for the intended use, then the Contractor shall promptly notify the Agency, detailing the facts, and at the Agency's expense repair, modify, return or take such other action as directed by the Agency. The parties may conduct a joint inspection of the property before the Contractor takes possession to document its condition.

The Agency retains title to all Agency-furnished property. Upon receipt of the Agency-furnished property, the Contractor assumes the charge and care of the property and bears the risk of loss or damage due to action of the elements or from any other cause. The Contractor shall provide appropriate protection for all such property during the progress of the Work. Should any Agency-furnished equipment or materials be damaged, such property shall be repaired or replaced at the Contractor's expense to the satisfaction of the Agency. No extension of time will be allowed for repair or replacement of such damaged items. Should the Contractor not repair or replace such damaged items, the Agency shall have the right to take corrective measures itself and deduct the cost from any sums owed to the Contractor.

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

SP 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 manufacturers' 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, \$5,000,000 combined single limits per occurrence, \$5,000,000 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, \$1,000,000 combined single limits per occurrence.

Contractor shall deliver to the Agency, 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 the Agency's Contract Administrator.

SP 10. Software Escrow Account

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

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

SP 11. Sustainability

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

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

SECTION 5: ACCEPTANCE TEST

AT 1. Responsibility

Fully documented tests shall be conducted on each production bus following manufacture to determine its acceptance to the City. These acceptance tests shall include pre-delivery inspections and testing by the Contractor and inspections and testing by the City after the buses have been delivered.

AT 2. Pre-Delivery Tests

The Contractor shall conduct acceptance tests at its plant on each bus following completion of manufacture and before delivery to the City. 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 the Contractors standard quality assurance procedures.

Additional tests may be conducted at the Contractor's discretion to ensure that the completed buses have attained the desired quality and have met the requirements in "Technical Specifications" (Part 7). the City may, prior to commencement of production, demand that the Contractor demonstrate compliance with any requirement in "Technical Specifications" (Part 7), if there is evidence that prior tests have been invalidated by Contractor's change of supplier or change in manufacturing process. Such demonstration shall be by actual test or by supplying a report of

a previously performed test on similar or like components and configuration. Any additional testing shall be recorded on appropriate test forms provided by the Contractor and shall be conducted before acceptance of the bus.

The pre-delivery tests shall be scheduled and conducted with 30 (thirty) days' notice so that they may be witnessed by the resident inspectors, who may accept or reject the results of the tests. The results of pre-delivery tests, and any other tests, shall be filed with the assembly inspection records for each bus. The underfloor equipment shall be available for inspection by the resident inspectors, using a pit or bus hoist provided by the Contractor. A hoist, scaffold, or elevated platform shall be provided by the Contractor to easily and safely inspect bus roofs. Delivery of each bus shall require written authorization of the primary resident inspector, if one is so designated. The Contractor shall provide authorization forms for the release of each bus for delivery. An executed copy of the authorization shall accompany the delivery of each bus.

AT 2.1 Visual and Measured Inspection

Visual and measured inspections shall be conducted with the bus in a static condition. The purpose of the inspection testing is to verify overall dimensional and weight requirements, to verify that required components are included and are ready for operation, and to verify that components and subsystems that are designed to operate with the bus in a static condition do function as designed.

AT 2.2 Total Bus Operation

Total bus operation shall be evaluated during road tests. The purpose of the road tests is to observe and verify the operation of the bus as a system and to verify the functional operation of the subsystems that can be operated only while the bus is in motion.

Each bus shall be driven for a minimum of 15 (fifteen) miles during the road tests. Observed Defects shall be recorded on the test forms. The bus shall be retested when Defects are corrected and adjustments are made. This process shall continue until Defects or required adjustments are no longer detected. Results shall be pass/fail for these bus operation tests.

AT 3. Post Delivery Tests

The City may conduct acceptance tests on each delivered bus. These tests shall be completed within 15 (fifteen) days after bus delivery and shall be conducted in accordance with written test plans. The purpose of these tests is to identify Defects that have become apparent between the time of bus release and delivery to the City. 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 nonacceptance. The City shall record details of all Defects on the appropriate test forms and shall notify the Contractor of acceptance, conditional acceptance, or nonacceptance of each bus within five days according to "Acceptance of Bus" after completion of the tests. The Defects detected during these tests shall be repaired according to procedures defined in "Contractual Provisions" (Part 3.3.2., "Repairs after Nonacceptance").

AT 3.1 Visual Inspection

The post-delivery inspection is similar to the inspection at the Contractor's plant and shall be conducted with the bus in a static condition. Any visual delivery damage shall be identified and recorded during the visual inspection of each bus.

AT 3.2 Total Bus Operation

Road tests will be used for total bus operation similar to those conducted at the Contractor's plant. In addition, the City may elect to perform chassis dynamometer tests. Operational deficiencies of each bus shall be identified and recorded.

SECTION 6: WARRANTY PROVISION

WP 1. Warranty Requirements

WP 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 City each complete bus, and specific subsystems and components as follows. The Contractor shall pass on to the City any warranty, offered by a component supplier, that is superior to that required herein. All major subsystems/component suppliers' warranties, as outlined below, must be purchased from the supplier by the Contractor. Prior to delivery of the first bus to a transit system, the Contractor shall submit to the City

written confirmation that all contractual extended warranties (as outlined in Sections 5.1.1.2, 5.1.1.3, 5.1.1.4, 5.1.1.5,) are in place with all major subsystem / component suppliers.

WP 1.2 Complete Bus

The complete bus, propulsion system, components, major subsystems, and body and chassis structure, are warranted to be free from Defects and Related Defects for Two years or 100,000 miles, whichever comes first, beginning on the date of acceptance, or conditional acceptance of each bus under "Acceptance of Bus". The warranty is based on regular operation of the bus under the operating conditions prevailing in the State of North Carolina.

WP 1.3 Body and Chassis Structure

Body, body structure, and structural elements of the suspension are warranted to be free from Defects, Related Defects, and to maintain structural integrity for three years or 150,000 miles, whichever comes first.

Primary load carrying members of the bus structure, including structural elements of the suspension, are warranted against corrosion failure and/or fatigue failure sufficient to cause a Class 1 or Class 2 failure for a period of 12 (twelve) years or 500,000 miles, whichever comes first.

WP 1.4 Propulsion System

Propulsion system components, and non-drive axles shall be warranted to be free from Defects and Related Defects for a minimum of five years or 300,000 miles, whichever comes first. Propulsion system manufacturer's standard warranty, delineating any items excluded from this warranty, shall be submitted by the Contractor as part of its technical information and Bids package.

WP 1.5 Major Subsystems

Major subsystems (see following list) shall be warranted to be free from Defects and Related Defects, for a minimum of three years or 150,000 miles, whichever comes first. The Contractor shall submit any Major subsystem manufacturers' standard warranties, delineating items excluded from this warranty, as part of its technical information and Bids package and detail the full warranty coverage that exceeds the minimum established as part of this IFB.

1. Brake system (excluding friction material)
2. Destination signs
3. Automatic Voice Annunciation System
4. Heating, Ventilating, and Air-conditioning system
5. Door systems
6. Air compressor and dryer
7. Wheelchair ramp system

8. Starter & Alternator
9. Power steering pumps and motors
10. All Exterior LEDs
11. All Interior LEDs

WP 1.6 Extension of Warranty

If, during the warranty period, repairs or modifications on any bus, made necessary by defective design, materials or workmanship are not completed due to lack of material or inability to provide the proper repair for 30 (thirty) calendar days, the applicable warranty period shall be extended by the number of days equal to the delay period.

WP 2. Voiding of Warranty

The warranties shall not apply to the failure of any part or component of the bus that directly results from misuse, negligence, accident, or repairs not conducted in accordance with the Contractor provided maintenance manuals and with workmanship performed by adequately trained personnel in accordance with recognized standards of the industry. The warranty shall also be void if the City fails to conduct normal inspections and scheduled preventive maintenance procedures as recommended in the Contractor's maintenance manuals and that omission caused the part or component failure. The City shall maintain documentation, auditable by the Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.

WP 3. Exceptions and Additions to Warranty

The warranties shall not apply to the scheduled maintenance items, normal wear-out items, and items furnished by the City, except insofar as such equipment may be damaged by the failure of a part or component for which the Contractor is responsible.

The warranty shall not apply to items furnished by the City' such as fareboxes, and other auxiliary equipment, except insofar as such equipment may be damaged by the failure of a part or component for which the Contractor is responsible. The Contractor shall pass on to the City any warranty, offered by a component supplier, that is superior to that required herein.

WP 4. Detection of Defects

The Contractor shall identify a representative as the central point of contact to handle all warranty matters on their behalf. If any of the Cities' detects a Defect within the warranty periods defined in "Warranty Requirements" it shall within 20 (twenty) working days, notify the Contractor's representative. Within five working days after receipt of notification, the Contractor's representative shall agree either that the Defect is in fact covered by warranty, or reserve judgment until the subsystem or component is inspected by the Contractor's representative or is removed and examined at that particular agency's property or at the Contractor's plant. At that time, the status of warranty coverage on the subsystem or component shall be mutually resolved between that agency and the Contractor. Work shall commence to correct the Defect within 10 (ten) working days after receipt of notification and shall be conducted in accordance with "Repairs by Contractor".

WP 5. Scope of Warranty Repairs

When warranty repairs are required, the Cities' and the Contractor's representatives shall agree within five working days after notification on the most appropriate course for the repairs and the exact scope of the repairs to be performed under the warranty. If no agreement is obtained within the five-day period, that particular agency reserves the right to commence the repairs in accordance with "Repairs by The City".

WP 6. Fleet Defects

WP 6.1 Occurrence and Remedy

A fleet defect is defined as cumulative failures of any kind in the same components in the same or similar application where such items covered by the warranty and such failures occur in the warranty period in 20 (twenty) percent of the

buses ordered and delivered under a single purchase order under this contract or 20 (twenty) percent of all of the buses ordered and delivered under all of the purchase orders issued as a result of the award of this solicitation.

The Contractor shall correct a fleet defect under the warranty provisions defined in "Repair Procedures". After correcting the Defect, the City 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 as a result of the award of this solicitation. Where the specific Defect can be solely attributed to particular identifiable part(s), the work program shall include redesign and/or replacement of only the defectively designed and/or manufactured part(s). In all other cases, the work program shall include inspection and/or correction of all of the buses in the fleet via a mutually agreed to arrangement.

WP 6.2 Exceptions to Fleet Defect Provisions

The fleet defect warranty provisions shall not apply to items supplied by the City, such as fareboxes, radio and fare collection equipment, communication systems, and tires.

WP 7.Product Recalls

In submitting this Bid, Bidder expressly assumes full responsibility for prompt notification of any product recall in accordance with the applicable state or federal regulations.

WP 8.Repair Basic Provision

WP 8.1 Repair Performance

The Contractor is responsible for all warranty-covered repair work. To the extent practicable, the City will allow the Contractor or its designated representative to perform such work. At its discretion, the City may perform such work if it is determined a need exists to do so based on transit service or other requirements. The Contractor shall reimburse such work.

WP 8.2 Repair by Contractor

The Contractor or its designated representative shall begin work on warranty-covered repairs, within five calendar days after receiving notification of a Defect from the City. The City shall make the bus available to complete repairs timely with the Contractor repair schedule.

The Contractor shall provide at its own expense all spare parts, tools, and space required to complete repairs. At the City's option, the Contractor may be required to remove the bus from the affected agency's property while repairs are being effected. If the bus is removed from the affected agency's property, repair procedures must be diligently pursued by the Contractor's representative.

WP 9. Repair by the City

WP 9.1 Parts Used

If the City performs the warranty-covered repairs, it shall correct or repair the Defect and any Related Defects utilizing parts supplied by the Contractor specifically for this repair. At its discretion, the affected agency may use Contractor-specified parts available from its own stock if deemed in its best interest. Monthly, or at a period to be mutually agreed upon, reports of all repairs covered by this warranty shall be submitted by the affected agency to the Contractor for reimbursement or replacement of parts. The Contractor shall provide forms for these reports.

WP 9.2 Contractor Supplied Parts

The City may require that the Contractor supply new parts for warranty-covered repairs being performed by the affected agency. These parts shall be shipped prepaid to the City from any source selected by the Contractor within 10 (ten) working days of receipt of the request for said parts. Parts supplied by the Contractor shall be Original Equipment Supplier (OEM) equivalent or superior to that used in the bus original manufacture.

WP 9.3 Defective Components Return

The Contractor may request that parts covered by the warranty be returned to the manufacturing plant. The Contractor shall pay the total cost for this action. Materials should be returned in accordance with Contractor's instructions.

WP 9.4 Failure Analysis

The Contractor shall, upon specific request of the City, provide a failure analysis of fleet defect or safety related parts, or major components, removed from buses under the terms of the warranty, that could affect fleet operation. Such reports shall be delivered within 60 (sixty) days of the receipt of failed parts.

WP 9.5 Reimbursement for Parts

The City shall be reimbursed by the Contractor for defective parts and for parts that must be replaced to correct the Defect. The reimbursement shall be at the current price at the time of repair and shall include taxes where applicable and a 15 (fifteen) percent handling costs.

WP 9.6 Reimbursement Requirements

The Contractor shall reimburse the City for warranty labor and/or parts within 60 (sixty) days of receipt of warranty claim.

WP 9.7 Warranty After Replacement/Repairs

If any component, unit, or subsystem is repaired, rebuilt or replaced by the Contractor, or by a City with the concurrence of the Contractor, the component, unit, or subsystem shall have the unexpired warranty period of the original. Repairs shall not be warranted if Contractor-provided or authorized parts are not used for the repair; unless the Contractor has failed to respond within five days, in accordance with "Scope of Warranty Repairs".

The warranty on items determined to be fleet defects as defined in Section 5.1.6 shall be extended for the time and/or miles of the original warranty remaining at the time the fleet defect was identified. This extended warranty shall begin on the repair/replacement date for corrected items on each bus.

SECTION 7: TRAINING PROVISIONS

TP 1. Overall Training Requirements

As part of supplying the new buses specified in this solicitation package, the successful Bidder will be required to have a comprehensive and appropriate program of training. The training must include support for deployment of the new vehicles, vehicle operation, and vehicle maintenance.

Each training module, both for the base bus and optional modules shall include an overview of the target system(s); how to install and configure spare components; and the procedures for preventative maintenance, inspection, fault diagnosis, component replacement, and warranty administration on each system component. Thus, the Bidder will be prepared to provide instruction targeted to the operation, servicing, and maintenance personnel.

The training program will be accomplished through a combination of City site, Bidder facility, and/or Original Equipment Manufacturers (OEM) locations. When responding to these requirements, as required in Attachment K, Comprehensive Base Bus and Optional Training Program Plan, Bidders must explain:

1. Which parts of the training program are *included* in their base bus cost and which parts they have bid as an optional service if different from the specification below;
2. Whether specific training modules in these requirements are Train-the-Trainer, Technical, or Original Equipment Manufacturers (OEM) modules;
3. Provide a recommended training schedule for each City order that is properly coordinated with the delivery and acceptance of the buses, and;
4. The number of training sessions that will be required for each base bus and optional training module if different from the specification below.

The Bidder shall assume that staff from the City do not have any specific knowledge of the systems detailed below; however, the Bidder can assume that staff are generally qualified for the function for which they are being trained (e.g., basic electrical, preventive maintenance, component maintenance, etc.). How the Bidder accounts for this assumption shall be explained in Appendix H.

The optional pricing Bidders enter into the Pricing Schedule will be for each bus order. The City retains the right to include or to omit any part of the training options on any order. The Lead Agency reserves the right to ask for a price breakdown for the base bus training if necessary to evaluate the Bids.

Each separate and distinct training program shall include all necessary training materials such as specific tools, equipment, identified training aids, and participant testing materials. These should be identified in Attachment K. Five (5) days prior to the delivery of the first bus to any City, the Bidder will provide the City with a CD-ROM/ memory stick using *readable, hyperlinked table of contents* in Portable Document Format (PDF) format. Two (2) copies of any other videos or additional instructional training aids will be provided with each bus order. The number of loose leaf copies of all lesson plans, training guides, student workbooks is defined in each subsection. The Bidder shall inform the City at least thirty (30) days of any training support equipment and/or supplies required to be supplied by the City for the Bidder portion of the training.

All training, unless otherwise allowed in this section, will be conducted at the city's facility. Off-site training must be described in the Bidders Attachment K.

All training instructors shall be competent to teach the course area they are instructing. Further, all instructors shall speak English and have a complete understanding of the English language. If the instructor or vendor presenter lacks the skill or knowledge to provide instruction, or cannot communicate with the students, the City reserves the right to request that the instructor be replaced and the area of training be repeated.

TP 2. Base Bus Training

As part of the base bus price, Bidder will provide the following four training modules. These items shall not be listed in the appropriate optional Pricing Schedule.

TP 2.1 Train-the-Trainer

The Bidder shall provide two (2) complete "Train the Trainer" (T-T-T) programs for the City's training personnel. Both T-T-T modules will be provided at the City's facility.

1. Basic Operators Training will be designed for Bus Operator Instructors, Street Supervisors, and Dispatchers and will cover vehicle operation, familiarization of drivers' console and related equipment, safety issues, and any unique operating characteristics of vehicle systems, such as fire suppression.
2. Maintenance Orientation Training will be designed for maintenance training personnel. This training is to be conducted at the City's facility and will encompass familiarization, operation, unique characteristics, service, and safety concerns of the vehicle and its systems.

These two programs will each be a minimum four (4) hours in length, and shall be a combination of classroom and hands-on instruction, the latter being presented on and around the bus.

TP 2.2 Basic Operators Training

Bidder will include the costs basic operators training. It will include complete training and instruction for the City's operations personnel. The program shall include, but not be limited to the following:

- Operator Compartment - Controls and Switches, Warning Indicators and Gauges, Seat Adjustment, Door Control.

- Destination Sign System Loading.
- Walk Around Inspection, Compartment-by-Compartment Explanation
- Climate Control system.
- Driving Instruction – Mirror Adjustments, Turns, Braking, Backing, Transmission
- Wheelchair Ramp Equipment, Controls, Safety, Securing Wheelchairs and Riders, Unloading Wheelchairs and Riders.
- Emergency Procedures.

The Bidder will provide optional pricing for training under subsequent bus orders.

TP 2.3 Basic Vehicle Maintenance

Bidders will include the costs of conducting T-T-T training covering vehicle orientation class for mechanics, service workers, and supervisors will be conducted. It will provide a detailed overview of the vehicle, service access locations to all major components, locations of all daily service items on the bus, location of all diagnostic ports, and other general operations and of vehicle maintenance. A minimum of four (4) hours per class will be provided. This is to be provided with the initial bus order. Optional pricing will be provided for subsequent order training.

TP 2.4 Base Bus Maintenance Orientation

Bidders will include complete training and instruction for City's designated Maintenance personnel. Bidder shall provide four sessions, one for the AM shift and one for the PM shift on two separate days. Class size is not to exceed 10 employees per session. The program shall at a minimum include the following:

Suspension; Steering; Axles; Electrical systems; Body; Engine & Fuel System; Parts; Engine and Vehicle Service Instruction; Air Conditioning; Doors; Towing; Brakes; Fire Suppression; Cooling Systems; and Air System.
Destination Sign System

Each trainee will be given an opportunity to operate the bus with the Bidder's instructor on board. The training shall be delivered on a schedule coordinated between the City's training department and the Bidder.

TP 2.5 AC/Heat System

A detailed twenty-four (24) hour class covering the bus heating and air conditioning system operations, maintenance, diagnostics and troubleshooting will be provided for mechanics, supervisors, and support staff. A minimum of one (1) class will be provided.

TP 3. Optional Technical Training (See Price Schedule)

The Bidder shall provide a structured program of technical training which will consist of specific and identifiably separate curriculum for each subject area. Each subject area training session shall be up to 40 (forty) hours of classroom/hands-on training based on subject area, with class size being no more than ten (10) participants. The training will be delivered at the City's location on a schedule coordinated by the City's training department and the Bidder.

For each training module outlined below, the Bidder shall clearly explain in Attachment K how it will be integrated with its overall training approach. The bidder will also identify the hours per session it believes is required in the Pricing Schedule. Where applicable, Bidder shall clearly explain in Attachment H how many session's it believes is required for up to ten (10) participants and whether the training will be done on the City's site, Bidder's facility, or OEM site.

TP 3.1 Bus Maintenance

A detailed twenty-four (24) hour class covering the bus air system, doors, suspension, body and other minor systems will be provided for the mechanics, supervisors, maintenance trainers and support staff. A minimum of one (1) class will be provided and Bid in the Pricing Schedule. This would be provided with the initial bus order.

TP 3.2 Bus Maintenance

A detailed twenty-four (24) hour class covering the bus electrical system including the charging/starting circuit, 12/24 volt power distribution, multiplex system, and all electrical schematics will be provided for the mechanics, supervisors, maintenance trainers and support staff. A minimum of one (1) class will be required.

TP 3.3 Transmission

The Bidder will provide a detailed thirty-two (32) hour class covering the Electric Drive System that includes Electric Drive System familiarization, operation, electronic controls, mechanical and electronic diagnostics will be provided for mechanics, supervisors, and support staff. A minimum of one (1) class will be provided.

TP 3.4 Electric Drive System Overhaul

A detailed forty (40) hour class covering the Electric Drive System provided that includes all aspects of Electric Drive System overhaul for maintenance supervisors and Mechanical Electrical Engineer. A minimum of one (1) class will be provided. *Training will be provided at DCT'S maintenance facility. The vendor will be responsible for their own travel expenses.*

TP 3.5 Fire Suppression

A detailed eight (8) hour class covering the Fire Suppression system including operation, maintenance, diagnostics, troubleshooting, and component replacement will be provided for the mechanics and supervisors. This class will cover any requirements needed for students to be able to perform required inspections for the fire suppression system. A minimum of one (1) class will be provided.

TP 3.6 Wheelchair Ramp

A detailed four (4) hour class covering the wheelchair ramp including operation, maintenance, hydraulics, controls, and repair will be provided for the mechanics, supervisors, and support staff. A minimum of one (1) class will be provided for up to ten (10) participants.

TP 3.7 Parts and Support Familiarization

A four (4) hour class covering the Bidder's parts manuals, parts ordering procedures, and recommended spare parts inventory levels will be provided for procurement, supervisors, and parts staff. A minimum of one class will be provided.

TP 3.8 Fare Collection Device

A detailed thirty-two (32) hour class covering the OEM's fare collection device including installation, configuration, equipment maintenance and repair, and data system training for the mechanics, supervisors, and support staff. A minimum of one (1) classes will be provided. Training can be provided at OEM's facility. The City will be responsible for attendees' travel expenses.

TP 3.9 Advance Design Bus

The Bidder shall provide a comprehensive training program that prepares maintenance staff for operation, diagnostics and troubleshooting, maintenance and an overview of Advanced Design Bus components provided by the Bidder. Training may be conducted by the Bidder or the original equipment manufacturers (OEMs) only. Systems to be covered are but not limited to.

TP 3.9.1 Destination Sign System

A detailed eight (8) hour class covering the destination sign system including operations, maintenance, diagnostics, troubleshooting, and component replacement will be provided for the mechanics, supervisors, and support staff. The Bidder will provide a minimum of one (1) class.

TP 3.9.2 Destination Sign System Programming

A detailed eight (8) hour class covering the destination sign system including use of the programming software, loading the destination sign listing into the system, sign list updates, programming features, and transfer of program to individual buses will be provided for the designated sign programmers. The Bidder will provide a minimum of one (1) class.

TP 3.9.3 Computer Aided Dispatch/Automatic Vehicle Location (CAD/AVL)

A detailed eight (8) hour class covering the CAD / AVL system including operations, maintenance, diagnostics, troubleshooting, and component replacement will be provided for the mechanics, supervisors, and support staff. A minimum of one (1) class will be provided.

TP 3.9.4 Automated Voice Announcement (AVA)

A detailed eight (8) hour class covering the AVA system including operations, maintenance, diagnostics, troubleshooting, configuration and component replacement will be provided for the mechanics, supervisors, and support staff. A minimum of one (1) class will be provided.

TP 3.9.5 Automated Passenger Counting (APC)

A detailed eight (8) hour class covering the APC system including operations, maintenance, diagnostics, troubleshooting, and component replacement will be provided for the mechanics and supervisors. A minimum of one (1) class will be provided.

TP 3.9.6 On-Board Surveillance System

A detailed eight (8) hour class covering the surveillance system including operations, maintenance, diagnostics, troubleshooting, configuration and component replacement will be provided for the mechanics, supervisors and operations supervisors. A minimum of one (1) class will be provided.

SECTION 8: TECHNICAL SPECIFICATIONS

TS 1. Definitions

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

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

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

NOTE: Analog signals are used to represent the state of variable devices such as rheostats, potentiometers, temperature probes, etc.

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.

Burst Pressure: The highest pressure reached in a container during a burst test. Capacity (fuel container): The water volume of a container in gallons (liters). Cells: Individual components (i.e., battery or capacitor cells).

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.

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.

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

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.

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.

Flow Capacity: 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 fuel 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: 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.

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

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

Hose: Flexible line.

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.

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

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

Module: 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 a container/cylinder, when subjected to a standard fire test as required by fuel container/cylinder standards.

NOTE: Since this is a pressure-activated device, it may not protect against rupture of the container when the application of heat weakens the container to the point where its rupture pressure is less than the rated burst pressure of the relief device, particularly if the container is partially full.

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, transmission, traction motors, 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.

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.

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

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 introduced into such a mixture, or when such a mixture comes into contact with them.

Special Tools: Tools not normally stocked by the Procuring Agency.

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

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

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

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

Stress Loops: The “pigtailed” 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.

NOTE: Since this is a thermally activated device, it does not protect against over- pressure from improper charging practices.

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 2. Scope

This Technical Specification details the City’s minimum acceptable requirements for a heavy duty, 30, 35, 40 foot long low floor Battery - Electric transit bus. These buses shall be used in fixed route service for rural and urban transit service operations on urban streets and rural roadways in the general environmental and climatic conditions prevailing throughout the cities operating area. The bus must be designed to have a minimum economic lifespan of 12 years or 500,000 miles, whichever comes first. The bus must be capable of accommodating the widest spectrum of passengers possible, including children, adults, elderly, and persons with disabilities.

TS 3. Configuration

TS 3.1 Transit Style Bus

The bus shall be a heavy duty, low-floor transit bus with a “Standard” transit bus look. The bus shall have two passenger doorways on the curbside, with the front passenger doorway located ahead of the front tires. The rear passenger doorway shall be located ahead of the rear tires. All doorways shall have low floor entry for use with street, low-level station platforms and/or street curbs. The low-floor section in the bus shall extend from the front

doorway to rearward of the rear doorway. The front doorway shall incorporate the ramp system mechanism for the mobility impaired.

TS 3.2 Weight

It will be a design goal to construct each bus as light in weight as possible without degradation of safety, appearance, comfort, traction or performance. The curb weight of the vehicle shall be less than 45,000 lbs.

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

TS 4. Service Life

The bus shall be designed to operate in transit service for at least twelve (12) years or 500,000 miles. It shall be capable of operating at least 48,000 miles per year including the twelfth year. Service life rating must be supported by all relevant full bus testing reports required under 49 CFR

665, as described in Section 2.7, Federal Requirements and Special Conditions for Rolling Stock.

TS 5. Maintenance and Inspection

Scheduled maintenance tasks shall be related and grouped in maximum mileage intervals. Based upon the design operating profile as defined in Section 7.7, Design Operating Environment., routine scheduled maintenance actions, such as filter replacement and adjustments, shall not be required at intervals of less than 6,000 miles, except for routine daily service performed during the fueling operations.

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.

TS 6. Interchangeability

Components with identical function shall be interchangeable to the extent practical. These components shall include passenger window hardware, interior trim, lamps, lamp lenses, and seat assemblies. Components with non-identical functions shall not be, or appear to be, interchangeable. A component shall not be used in an application for which it was neither designed nor intended. Any one component or unit used in the construction of these buses shall be an exact duplicate in design, manufacture, and assembly for each bus in each order group in this Contract. Contractor shall identify and secure approval for any changes in components or unit construction provided within a Contract.

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

The City 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 7. Design Operating Environment

The bus shall achieve normal operation in ambient temperature ranges of 10 °F to 115 °F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 3000 ft. above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 10 °F, above 115 °F or at altitudes above 3000 ft. Altitude requirements above 3000 ft. will need separate discussions with the propulsion system manufacturer to ensure that performance requirements are not compromised. Speed, gradability and acceleration performance requirements shall be met at, or corrected to, 77 °F, 29.31 in. Hg, dry air per SAE J1995.

TS 8. Noise

TS 8.1 Interior Noise

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

level of 53.0 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the propulsion system and accessories switched off. The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 82.0 dBA, except at the rear bench seat, which shall not exceed 85.0 decibels and the operator, shall not experience a noise level of more than 81.0 dBA under the following test conditions. The bus shall be empty except for test personnel, not to exceed four (4) persons, and the test equipment. All openings shall be closed and all accessories shall be operating during the test. The bus shall accelerate at full throttle from a standstill to 35 mph on level commercial asphalt or concrete pavement in an area free of large reflecting surfaces within 50 feet of the bus path. During the test, the ambient noise level in the test area shall be at least 10 dBA lower than the bus under test. Instrumentation and other general requirements shall conform to SAE Standard J366. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured.

TS 8.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 83 dBA under full power acceleration when operated at or below 35 mph at curb weight and just prior to transmission up shift. The maximum noise level generated by the bus pulling away from a stop at full power shall not exceed 83 dBA. The bus-generated noise at curb idle shall not exceed 65 dBA. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured. All noise readings shall be taken 50 feet from and perpendicular to, the centerline of the bus with all accessories operating. Instrumentation, test sites, and other general requirements shall be in accordance with SAE Standard J366. The pull away test shall begin with the front bumper even with the microphone. The curb idle test shall be conducted with the rear bumper even with the microphone.

In addition, the Manufacturer shall comply with the exterior noise requirements defined in local laws and ordinances identified by the City.

TS 9. Fire Safety

The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emissions regulations. These provisions shall include the use of fire retardant/ low-smoke materials, amrex fire detection and suppression systems (or approved equal), firewalls, and facilitation of passenger evacuation. Materials entirely enclosed from the passenger compartment need not comply, unless otherwise specified. In addition, smaller components and items, such as switch knobs and small light lenses, shall be exempt from this requirement.

All materials used in the construction of the passenger compartment of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FMVSS 302. Materials entirely enclosed from the passenger compartment need not comply, unless otherwise specified. In addition, smaller components and items, such as switch knobs and small light lenses, shall be exempt from this requirement.

TS 10. Physical Size

Bus Length

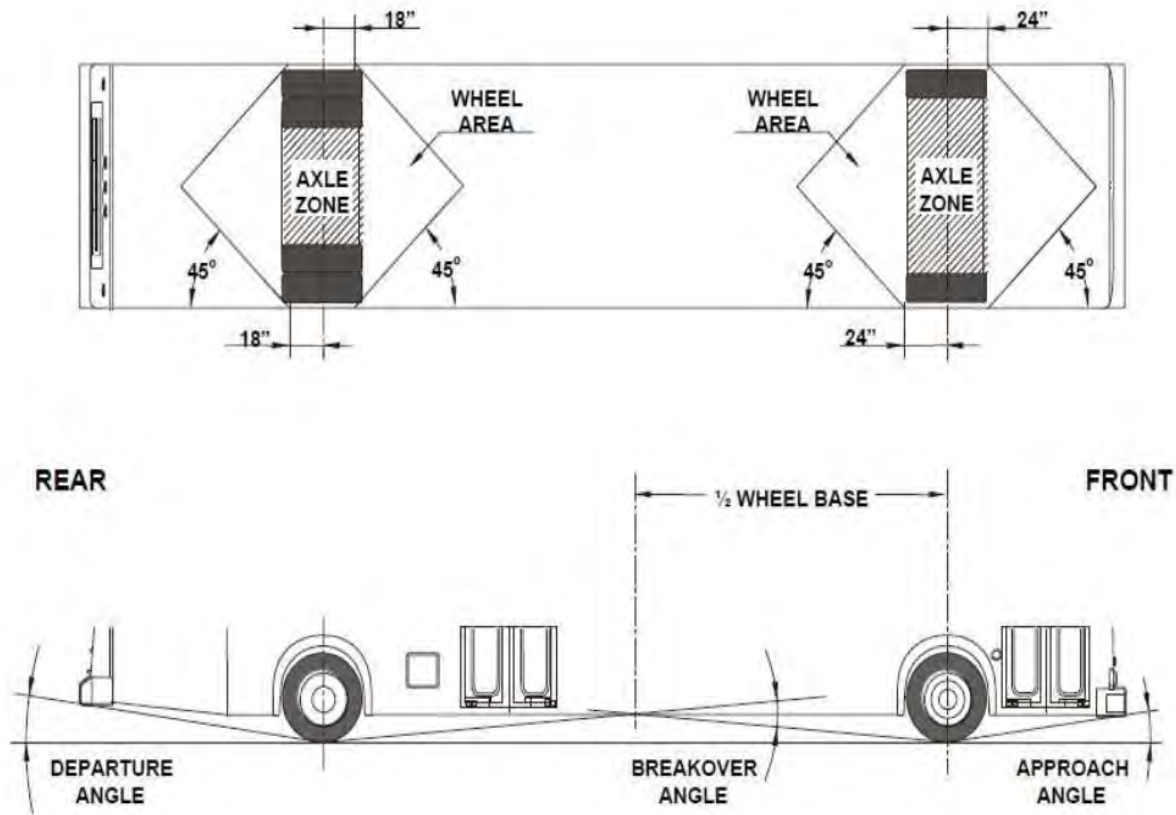
For ease of use, the following tolerances will be allowable for each given bus length. Bus length is determined as the measurement from bumper to bumper.

General Dimensions and Weights

30-ft bus:	29 ft., 11 in. to 34 ft., 11 in.
35ft bus:	35ft to 39ft, 11 in.
40ft bus:	40 ft. to 43ft

Minimum Width Over Body (excluding mirrors)	102 In.
Height Maximum	135 In.
Maximum Front Step Height	16 In.
Head Room Minimum at Center of Aisle	95 In.
Minimum Head Room at Rear Center of Aisle (if tapered)	76 In.
Maximum Turning Radius Outside Bumper	45 Ft. 4.5 In.
Vehicle Weight Max GVWR	45,000 Lbs.





TS 11. Underbody Clearance

The bus shall maintain the minimum clearance dimensions (i.e. “Ground Clearance at Front Axle” and “Ground Clearance Outside of Axle”) as defined in SAE Standard J689, regardless of load up to the gross vehicle weight rating.

TS 12. Other Clearances

Non-compliant clearances must be identified to the Procuring Agency, and non-compliances will not be considered without appropriate protection for all non-compliant structure and components.

TS 13. Interior

TS 13.1 Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 95 inches and may taper in the rear portion of the bus to no less than 76 inches at the forward edge of the rear bench seat.

TS 13.2 Step

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

TS 14. Vehicle Performance

TS 14.1 Power Requirements

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

TS 14.2 Top Speed

The bus shall be capable of achieving a top speed of 65 mph on a straight, level road at GVWR with all accessories operating. The bus shall be capable of safely maintaining the vehicle speed according to the recommendations by the tire manufacturer.

TS 14.3 Gradability

Gradability requirements shall be met on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating. The propulsion system and drive train shall enable the bus to achieve and maintain a speed of 40 mph on a 2-1/2 percent ascending grade and 7 mph on a 16 percent ascending grade.

TS 14.4 Operating Range

The nominal operating range of a 30, 35, 40' Battery – Electric bus, when run on the Transit Coach Duty cycle of at least 150 miles with full charge capacity via Long Range Slow Charge Process.

TS 14.5 Energy Storage

Energy storage on board the bus shall be a minimum of 440KW or the maximum available using latest technology available at time of production. Each individual storage module shall be interchangeable.

TS 14.6 ESS Charging

The Vehicle Charging Unit must be a Long Range Slow Charge Unit with a commercially available plug-in charger that uses the SAE J1772 CCS standard charging protocol. The Contractor shall supply a battery charger unit for the City Transit Facility capable of recharging the electric bus propulsion batteries to a state (full charge) necessary for the bus to complete a 200 mile circuit per charge or 14 hours. The plug-in charging station shall be capable of fully charging the bus within 6 hours.

Two (2) Charging DC outlets will be required on each bus-One in the front third of the bus and one on R/S rear. A compatible charging Station will be priced in the base pricing for each bus.

TS 15. Traction Motor

Traction motor will be permanent Magnetic type rated at peak with a minimum of 350KW/3400 Nm (469 hp/ 2500 lb-ft) and 225KW/1850 Nm (302 hp/1365 lb-ft).

The Traction motor shall be equipped with a microprocessor based electronic control system that complies with SAE J1708 and SAE J1939, Recommended Practice for Serial Data Communications between Microcomputer Systems in Heavy Duty Vehicle Applications. The traction motor electronic management system shall monitor operating conditions and provide instantaneous adjustments to optimize bus performance.

The traction motor shall have onboard diagnostic capabilities, able to monitor vital functions, store out of parameter conditions in memory, and communicate faults and vital conditions to service personnel. Trouble codes logged by

the ECM shall be permanently retained in the ECM memory until removed with proper service equipment. The system must be equipped with two data link connections. One located in the rear compartment and the second located in the driver's area. The system shall be reprogrammable to allow optimization of bus performance. In order to avoid potential warranty disputes during warranty period, initial performance settings shall only be changed with the authorization from bus and drive system manufacturers. Data stored by said system shall be easily extractable via hard wire link and capable of transmission via the communications system. Conversely, the system shall be capable of similar modes of communications to upload various traction motor control settings inherent to the control system software architecture. Furthermore, the manufacturer shall provide the Transit Agency with samples of pre-formatted traction motor performance/management reports featured in the proposed control system software architecture.

The control system shall protect the system against progressive damage. The system shall monitor conditions critical for safe operation and automatically de-rate power and/or speed and initiate shutdown as needed. The on-board diagnostic system shall trigger a visual and audible alarm to the operator when the control unit or the fire suppression system detects a malfunction and the protection system is activated. Automatic shutdown shall occur within ten (10) seconds only when critical conditions are met.

An override switch, requiring constant depression, available to the operator shall allow an additional thirty (30) seconds of operation before final shutdown.

NOTE: System shut down devices for critical faults shall be of the latest current production design. A visual and audible indication will be provided in the driver's area to indicate when a device has been activated. For safety, a 30-second over-rule switch shall be installed in the dash to permit the vehicle to be moved to a safe area.

TS 16. Cooling System

The cooling system shall be of sufficient size to maintain all cooling needs, continuous operating temperatures during the most severe operations possible and in accordance with component manufacturers' cooling system requirements. The cooling system fan/fans control should sense the temperatures of the operating fluids and if it 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.

The system shall be cooled by a water-based, pressure type, cooling system that does not permit boiling or coolant loss during the operations described above. Thermostats shall be easily accessible for replacement. Shutoff valves shall allow filter replacement without coolant loss. Valves shall permit complete shutoff of lines for the heating and defroster units, and water booster pumps. The water boost pump shall be a long life 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.

An electric fan cooling system is required. Electric fans shall be brushless, variable speed, reversible and have a corrosion resistant metal shroud with finger guards that meet SAE spec J1308 200808. The fans should be isolated from one another with baffles. The fans should provide electronic feedback control and have diagnostics capability through the standard SAE J1939 diagnostics port. The cooling system shall consist of multiple electric DC brushless variable speed fans with electronic feedback controls. Electric fan motor speeds shall have a minimum operating range of 0-5500 rpm with capability of manual or automatic reverse operation in order to assist in debris removal. The cooling system shall be equipped with a master controller with the following capabilities; automatically reduce fan speed when the vehicle stops to minimize noise at the curbside, communicate on the J1939 CAN data link with system diagnostic retorting via DM1 messaging, review and download data via a laptop with service tool software, capable of software and calibration up-dates, receive commands from the propulsion system ECM, sense propulsion system and battery storage compartments temperature and activate fans if maximum temperature is exceeded, collect

and store cooling system and vehicle performance histogram data. Service tool software must include history, data and logging analysis tool. If system controller loses communication with the propulsion system and/or battery storage system or sensors it shall direct all fans to go into a default speed mode to avoid vehicle shutdown. If fans lose communication with system controller, they shall go into a default speed mode to avoid vehicle shutdown.

Telematics must be able to quarry cooling system for performance/malfunction data and reverse fans. This communication shall use the industry standard RP1210 compliant datalink adapters connected via the standard 9-pin diagnostic connector found in the propulsion system compartment and interior of the bus. Independent diagnostic detection shall be capable of identifying specifically which fan, measured input parameter, or datalink input parameter is experiencing a fault condition. Report both active and previously active fault codes with the number of detections/occurrences, time of the first and most recent fault detection, and cumulative time the fault was active. Where electric fans are used for cooling there shall be ample field experience. As a minimum, 500 electric fan based cooling systems shall be in transit or coach revenue generating operation for at least 4 years.

A sight glass to determine satisfactory coolant level shall be provided and shall be accessible by opening one of the compartment's access doors. A spring-loaded, push button type valve to safely release pressure or vacuum in the cooling system shall be provided with both it and the water filler no more than 60 inches above the ground and both shall be accessible through the same access door.

The radiator, shall be of durable corrosion-resistant construction. Brazed aluminum shall have welded cast tanks. Automotive crimped-on tanks are more susceptible to leaks and early failure, and shall not be used. Radiators shall have a fin density 10 fins per inch or less and shall not have louvered/slit designs. These are more susceptible to clogging and deteriorating cooling performance over time and shall not be used. Radiators shall utilize a bar and plate design so they are robust and can be cleaned with high pressure spray wash. Radiator shroud must have baffles between fans to reduce air circulation.

For certain severe environments, a secondary cooler may be used to increase the ambient temperature capacity for a cooling system. The secondary cooler shall be remote mounted, but below the coolant surge tank. Air flow should be provided with brushless electric fans. If an application requires a boost pump to maintain coolant flow to the secondary cooler, a brushless electric water pump shall be used.

The radiator shall be designed to withstand thermal fatigue and vibration associated with the installed configuration.

TS 16.1 Cooling System-Electric

The cooling systems shall be of sufficient size to maintain continuous operating temperatures during the most severe operations possible and in accordance with manufactures cooling system requirements. The cooling system shall double as a heat source to aid in the climate control of the interior of the bus. The cooling system fan controls should independently sense the temperatures of the operating components and if above safe operating conditions the cooling fans should be engaged. The fan control system shall be designed with a failsafe mode of "fan on". The cooling system in new condition shall have an ambient capacity with vehicle at max. GVW of at least 115°F at Peak Power and 120°F at Peak Torque using a 50-50 mix of ethylene glycol/water at sea level operation.

TS 16.2 Mounting

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

TS 17. Battery Cooling

The Battery shall be cooled by a dedicated heat exchanger sized to maintain operating fluid within the manufacturer's

recommended parameters of flow, pressure and temperature. The Battery cooling system shall be matched to the Electrical systems to ensure that all components remain within recommended temperature limits established by each component manufacturer.

TS 18. Regenerative Braking

A regenerative braking system shall be employed to aid in the reduction of wear to the brakes and to help extend the range of the vehicle. The vehicle will employ regenerative braking as the accelerator pedal is completely released. Regenerative braking is additionally increased as the brake pedal is applied which also increases service brake application.

TS 19. Mounting

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

TS 20. Service

The propulsion system shall be arranged for ease of access and maintenance. The Contractor shall provide all special tools, training, and fixtures or facility requirements recommended for servicing. A credit will be provided for the Procuring Agency that does not need the tools, all accessories and any other component requiring service or replacement shall be easily removable. Remote mounted gauges shall be provided in the propulsion system compartment. These gauges shall be easily read during service and mounted in an area where they shall not be damaged during minor or major repairs.

All 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.

TS 21. Hydraulic System

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. High pressure hydraulic lines shall be as short as practicable and shall be routed or shielded so that failure of the fittings or line shall not allow the contents to spray or drain onto any component operable above the auto-ignition temperature of the fluid. All hydraulic lines shall meet the requirements of this particular section, and all elements of the hydraulic system shall meet the noise limits defined in this set of specifications. 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. A low hydraulic oil level sensor will be provided.

TS 21.1 Fluid Lines

All lines and piping shall be supported to prevent chafing damage, fatigue failures, degradation and tension strain. Lines passing through a panel, frame, or bulkhead shall be protected by grommets (or similar device) that fit snugly to both the line and the perimeter of the hole that the line passes through to prevent chafing and/or wear. 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 lines running from the rear to the front of the bus shall be at the shortest practical distance possible.

Aeroquip Premium lines (or approved equal) will be used to minimize maintenance.

TS 21.2 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 propulsion system compartment, resistant to road salts near the road surface, etc.).

Compression fittings shall be standardized as much as practicable to prevent the intermixing of components. Compression fitting components from more than one manufacturer shall not be mixed even if the components are known to be interchangeable. All valves, to the most practical extent possible, shall be ¼ turn in operation.

TS 22. Radiator

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. 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 contracting with the hose in response to temperature changes and aging of the hose material.

Radiator should be constructed with a petcock on the lower radiator tube.

TS 23. 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 in which it is intended, i.e., high temperatures in propulsion system compartment, road salts, oils, etc. Lines shall be capable of withstanding maximum system pressures. Lines within the propulsion system compartment shall be Aeroquip (or approved equal). 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. The materials used in mounting shall withstand the adverse effects of road salts, and accumulation of ice and snow for the life of the bus.

TS 24. Labeling

The capacity, date of manufacture, manufacturer name, location of manufacture, and certification of compliance to federal motor carrier safety regulations shall be permanently marked on the fuel tank(s). The markings shall be readily visible and shall not be covered with an undercoating material.

TS 25. Structure

TS 25.1 Design

The bus must be constructed of a monocoque or semi-monocoque design with a stainless steel chassis.

At all points where dissimilar metals are joined together, particular attention will be given to anticorrosion treatment to prevent electrolysis.

All painted aluminum sheets shall be thoroughly cleaned and coated on the outside with primer Corlar 25P prior to installation on the bus. All sidewall assemblies shall have anodized extruded aluminum vertical posts and shall be coated with primer Corlar 25P (or approved equal) prior to installation.

All piping, pumps, tubing, cables, and wiring shall be properly bracketed. All pass through holes for piping, tubing, cables, and wires shall be free of sharp and rough edges, protected by grommets, solid sleeve P-clamps or by other means to prevent damage over the life of the buses.

All pipe fittings shall be of heavy-duty type and shall be designed to withstand the maximum pressure that could be generated under normal or overload conditions, within the air or fluid system of which they are a component. All coolant and water lines routed through the interior of the bus will be done in a method that prevents leaks into the interior of the bus.

The structure shall be assembled by bolting, riveting or adhesive bonding. All welding connections shall conform to AWS standards for quality and fitness for purpose. Welding procedures, welding materials, and qualifications of welding operators and inspectors shall be in accordance with AWS and ASTM standards. Appropriate European or other international standards may be used if the Manufacturer demonstrates the equivalence of these standards. Welds shall have a finished appearance where visible. For all welded connections, the contact surfaces shall be free of scale, grease, and paint.

All surfaces to which springs are attached shall be of such a pattern as to prevent excessive grooving or wear of the parts.

All joints shall be protected by application of zinc-chromate metallic compound, butyl tape sealer (or approved equal) at assembly. All bolts, nuts, washers and exposed linkage shall be zinc- or cadmium-plated carbon steel, or stainless steel. Zinc plating shall conform to the latest revision of ASTM-B-633, Type II, SC3 or SC4. Cadmium plating shall conform to the latest revision of Federal Specification QQ-P-416b, Class 2 or 3, Type II.

All bolted connections shall be designed to a minimum strength value of SAE Grade 5 or metric equivalent nuts and bolts using a minimum design margin of 1.5 based on proof load of the bolt. Bolts, nuts and washers shall be of domestic manufacture and shall be SAE Grade 5 or better and marked according to SAE Standards J429 and J995 or metric equivalent. Any deviations from this standard will require pre-approval during Design Review.

Specific manufacturer's recommendations as to the adjustment and settings of components shall be provided before delivery of the first bus. Items such as air spring heights, voltage regulator, governors, and any other pertinent data shall be furnished to allow time to prepare service and inspection forms for initial bus inspection.

TS 26. Altoona Testing

Successful completion of all FTA Altoona testing must be completed prior to delivering the bus. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure that any and all such failures will not occur shall be submitted to the City per the Altoona certification requirement in Section 2.2.3, Specifications.

TS 27. Structural Validation

TS 27.1 Baseline Structural Analysis

The structure of the bus shall have undergone appropriate structural testing and/or analysis. The OEM shall provide the City with completed reports of the following structural test regimen for the proposed bus model:

- Altoona testing
- Finite Element Analysis (FEA)
- Shaker Table analysis
- Side impact of a 4,000-pound automobile at 25 mph (as defined in the Crashworthiness section)

TS 27.2 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 27.3 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 27.4 Propulsion System Compartment Bulkheads

The passenger and propulsion system compartment shall be separated by fire-resistant bulkheads. This bulkhead shall preclude or retard propagation of a propulsion 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, or the most recent Fire Safety practices available. 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 propulsion system compartment by fire-resistant material. Piping through the bulkhead shall have fire-resistant fittings sealed at the bulkhead. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the bulkhead. 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 27.5 Crashworthiness

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, 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.

The coach, at GVWR and under static conditions, shall not exhibit deformation or deflection that impairs operation of doors, windows, or other mechanical elements. Static conditions include the vehicle at rest with any one wheel or dual set of wheels on a 6 inch curb or in a 6 inch deep hole.

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.

To protect passengers seated in low floor area, the basic low floor coach structure shall incorporate a substantial side impact barrier. The barrier shall include steel plate, continuous between the front wheels arches and the rear suspension (except in the width of the exit door opening). The impact barrier shall be an integral welded part of the undercarriage portion of the coach structure, and shall be angled such that vehicles impacting the coach side will tend to subvert. To further increase both passenger safety and reparability, robust welded structures are required between the angled barrier and the coach side skins. These shall be designed to dissipate collision energy.

TS 27.6 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 the Agency's use of proper cleaning and neutralizing agents.

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

TS 28. Towing

Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 deg of the longitudinal axis of the bus. If applicable, the rear towing device(s) shall not provide a foothold 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.

TS 28.1 No Provision of Glad-Hand Type Connectors for Towing

No glad-hand type connector shall be provided.

TS 28.2 Lift (Supported) Front Axle and Flat Towing Capability

The front towing devices shall allow attachment of adapters for a rigid tow bar and shall permit the lifting of the bus until the front wheels are clear off the ground in order to position the bus on the towing equipment by the front wheels. These devices shall also permit common flat towing.

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 the City. 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 29. 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 30. Hoisting

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

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 31. Floor

TS 31.1 Design

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 $\frac{1}{4}$ 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.

TS 31.2 Bi-Level Floor Design

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

TS 31.3 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 $\frac{1}{2}$ in. diameter rod, with $\frac{1}{32}$ in. radius, without permanent visible deformation.

TS 31.4 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. Molding trims for the flooring shall be stainless steel.

TS 31.5 Composite Transit Floor

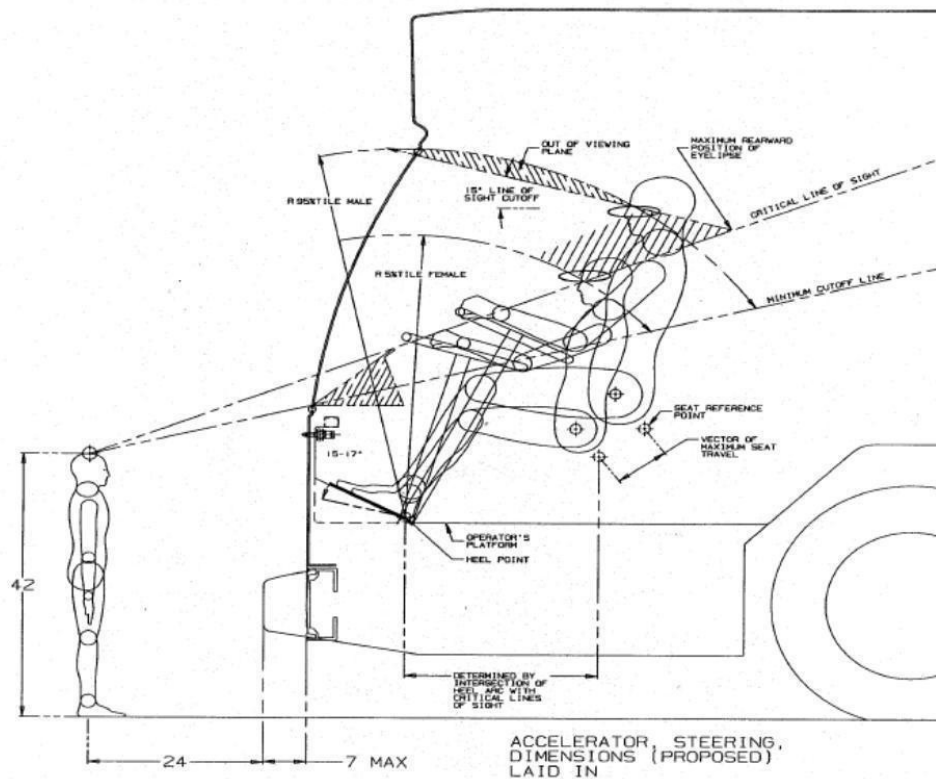
MCI composite subfloor (or approved equal) shall pass all North American ASTM E-162 (Flame); E- 662 (Smoke) and BSS 7239 / SMP 800-C (Toxicity) requirements. Composite flooring shall meet guidelines as referenced in NFPA 130. Subfloor needs to be huck-bolted to the chassis (not screwed).

TS 32. Platforms

TS 32.1 Drivers' Area

The driver's area shall contain all apparatus and controls necessary for operation of the bus. The layout shall maximize the use of available space and shall employ sound human factors and industrial design principles. The operator's area and equipment shall be designed to ensure safe and optimal performance for operators in the range of the 5th percentile female to the 95th percentile male. The operator's area shall be free of sharp edges, protruding objects, safety hazards and floor obstructions. Each requirement of this section is subject to approval at the pre- production meetings.

The driver's platform shall be of a height that, in a seated position, the driver can see an object located at an elevation of 42" above the road surface, 24" 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 degrees. A warning decal or sign shall be provided to alert the driver to the change in floor level. The following schematic diagram illustrates a means by which the platform height can be determined, using the Critical Line of Sight.



TS 32.2 Farebox

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

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

TS 32.3 Rear Step Area to Rear Area

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. A maximum of two steps, with not more than 9.5-inch risers of uniform height, may be provided in the aisle rearward of the rear door post leading to a "high-floor" area in the rear of the bus. Steps shall be the width of the aisle as determined by the seating in the immediate area of the steps. Step structure shall be corrosion-resistant throughout the life of the bus. Each step shall simultaneously support 300-pound loads evenly distributed over any six (6) inch wide section of the tread without permanent deformation and with elastic deflection of no more than 0.125 inches. Each step tread shall support a load of 500 pounds evenly distributed over the center half of the tread without permanent deformation. All corners in the step-area shall have radii no less than one-quarter (1/4) inch to facilitate cleaning. All step treads shall be of uniform depth, which shall be no less than eleven (11) inches, and the plane of the step treads shall be parallel to the plane of the floor. Treads shall be covered with, non-skid, heavy duty composition material that shall remain effective in all weather conditions. Color of the tread covering shall match the vestibule flooring. The edge of the high floor shall have no overhang at the step riser.

The edge of the high floor and the end of the step tread shall have a bright, contrasting yellow band no less than two inches wide on the full width of the step. The color shall be permanently blended into the tread covering material.

The steps leading up into the high floor rear section of the bus shall have a metal nosing with Dialight (or approved equal) LED step lighting integrated into the edge of the step and shall extend the entire width of the step.

TS 33. Wheel Housing

Wheel housings shall have sufficient sound insulation to minimize tire and road noise and meet all noise requirements of this specification. Wheel housings shall be constructed of stainless steel material and shall be no less than fourteen (14) gauge (0.0125-inch). The wheel housing shall be securely mounted and sealed to the bus body structure and it shall be isolated from dissimilar metals to prevent galvanic corrosion. Wheel housings, as installed, shall withstand impacts of a tire tread dislodging or stone throw at 55 mph, which is simulated by impacts of a two (2) inch steel ball with at least 200 foot-pounds of energy without penetration or visual deformation. Location and design of the construction of the wheel housing shall be submitted for approval at the pre-production meeting.

Each of the front wheel housings interior shall be covered with a single FRP panel with a twenty-five (25) percent gloss black gel coat finish. The FRP covers shall be securely mounted to the bus structure and shall withstand kicking and other abuse by boarding passengers and shall carry the structural loads of the attached passenger assists and electrical locker without visual or sensual deformation. The rear wheel housings interior shall be covered with the same material as the bus flooring. Edges shall be trimmed with rubber nosing.

TS 34. Chassis

The chassis shall consist of structural stainless steel for maximum durability, reduced maintenance, and weight and improved corrosion resistance. It shall be welded and huck bolted throughout.

TS 34.1 Suspension

The front axle of a 30, 35, 40' bus shall be a Meritor model FH946 (or approved equal) non-driving solid beam with a 16,100 lbs. minimum load rating. Both the front and rear axle suspensions shall be pneumatic type. The system will consist of four rear and four front Firestone Rolling Lobe air bellows (or approved equal). The outside edge of the rear air springs shall be located in front of and to the rear of the dual wheels, no more than six-inches from the bus sidewalls. The basic suspension system shall last the life of the bus without major overhaul or replacement. Items such as shock absorbers, radius rods, bushings, leveling valves and air springs shall be easily and quickly replaceable. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. A maximum of one of the four radius rod on each axle shall be of adjustable length. Necessary adjustments shall be easily accomplished without removing or disconnecting the components. If radius rods and or radius rod ends are exposed to road hazards/obstructions, appropriate provisions must be made to ensure a radius rod or rod eyelet failure do not result in a loss of steering control. Rear Axle minimum rating shall be 28,660 LBS.

TS 34.2 Damping

Vertical damping of the suspension system shall be accomplished by hydraulic shock absorbers mounted to the suspension arms or axles and attached to an appropriate location on the chassis. Damping shall be sufficient to control coach motion to three cycles or 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.

TS 34.3 Rear Axle

The buses shall have a Meritor rear axle rated at 28,660 lbs. (or approved equal).

TS 34.4 Springs and Shock Absorbers Travel

The suspension system shall permit a minimum wheel travel of 2.75 inches in bounce and 2.75 inches in rebound.

Elastomeric bumpers shall be provided at the limit of bounce 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 +/- one-half (1/2) inch at any point. Delco or Barksdale height control valves are preferred.

TS 34.5 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 6000 miles.

TS 34.6 Kneeling

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

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

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

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

TS 35. Wheels and Tires

TS 35.1 Wheels

Wheels and rims shall be Alcoa Dura Bright polished finished hub-piloted wheel (or approved equal). 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. Rear wheels must have sufficient spacing between dual tires to permit the use of skid chains. Wheel nuts shall be torqued to the manufacturer's specification with disc-locks of an inch size (not metric) on all lug nuts. One extra mounted and balanced wheel and tire assembly shall be furnished with each bus. All wheelhouses shall be constructed of stainless steel and able to resist damage from, and precluding the entry of, foreign objects.

TS 35.2 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. An air pressure monitoring system shall be included for all tires.

The manufacturer shall apply an approved lubricant to each rim prior to mounting the tire assembly. The tires shall be so mounted such that the position of the valve stem will locate the tire brand number inward, except the outside rear which shall be outward. The valve stems shall be those recommended by the tire manufacturer (or approved equal), approximately three (3) inches long with 31 degree bend. The rear wheel tire stems shall be aligned opposite each other at the rim opening to permit ease of service and fitted with extensions as needed to ensure ease of inside tire inflation.

The tires will be Continental Crosstrak HA3 H and shall be the appropriate size and load range for the vehicle. The Contractor will provide all tires and wheels including one (1) spare for front and rear axle.

TS 36. Steering

Assisted power steering shall be provided. The steering gear shall be an integral type with flexible lines eliminated or the number and length minimized.

TS 36.1 Steering Axle

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 (frontlock) wheel shall be within 2 deg of true Ackerman up to 50 percent lock measured at the inside (backlock) wheel. The steering geometry shall be within 3 deg of true Ackerman for the remaining 100 percent lock measured at the inside (backlock) wheel.

TS 37 Steering Wheel

TS 37.1 General

The steering wheel diameter shall be approximately 18 to 20 in.; the rim diameter shall be $\frac{7}{8}$ to $1\frac{1}{4}$ in. and shaped for firm grip with comfort for long periods of time. Steering wheel spokes and wheel thickness shall ensure visibility of the dashboard so that vital instrumentation is clearly visible at center neutral position (within the range of a 95th-percentile male, as described in SAE 1050a, Sections 4.2.2 and 4.2.3). Placement of steering column must be as far forward as possible, but either in line with or behind the instrument cluster.

TS 37.2 Turning Effort

Steering effort shall be measured with the bus at GVWR, stopped with the brakes released 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 37.3 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 37.4 Telescopic Adjustment

The steering wheel shall have full telescoping capability and have a minimum telescopic range of 2 in. and a minimum low-end adjustment of 29 in., measured from the top of the steering wheel rim in the horizontal position to the cab floor at the heel point.

TABLE 4
Steering Wheel Height¹ Relative to Angle of Slope

At Minimum Telescopic Height Adjustment (29 in.)		At Maximum Telescopic Height Adjustment (5 in.)	
Angle of Slope	Height	Angle of Slope	Height
0 deg	29 in.	0 deg	34 in.
15 deg	26.2 in.	15 deg	31.2 in.
25 deg	24.6 in.	25 deg	29.6 in.
35 deg	22.5 in.	35 deg	27.5 in.

– 1. Measured from bottom portion closest to driver.

TS 38. Rear 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 regenerative modes with respect to duty cycle.

NOTE: The regenerative braking duty cycle can be more aggressive than propulsion.

The drive shaft shall be guarded to prevent hitting any critical systems, including brake lines, coach floor or the ground, in the event of a tube or universal joint failure.

TS 39. Turning Radius

Bus Length (approximate)	Maximum Turning Radius	Agency Requirement
30 ft.	31 ft. (TR0)	
35 ft.	39 ft. (TR0)	
40 ft.	45 ft. (TR0)	

TS 40. Brakes

TS 40.1 Service Brake

Meritor four wheel self-adjusting disc brakes shall be supplied (or Approved equal). Brake wear indicators are provide.

TS 40.2 Actuation

Service brakes shall be controlled and actuated by an air system. Force to activate the brake pedal control shall be an essentially linear function of the bus deceleration rate and shall not exceed fifty (50) pounds at a point seven (7) inches above the heel point of the pedal to achieve maximum emergency braking. Buses shall be equipped with a WABCO antilock braking system (or approved equal). The microprocessor for the ABS system shall be mounted inside the bus so it is protected from corrosion and road debris. ABS shall control all wheels with dual controllers, (two (2) wheels at a time) and shall regulate the Regenerative braking in avoidance of wheel slip. A warning light that would indicate to the operator that the ABS system malfunctioned shall be provided.

TS 40. 3 Friction Material

The brake Pads 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 pad. The complete brake pad wear indicator shall be clearly visible from the hoist or pit without removing backing plates.

TS 40.4 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 bus shall be equipped with disc brakes on all axles, and the brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

The brake system material and design shall be selected to absorb and dissipate heat quickly so that the heat generated during braking operation does not glaze the brake pads.

TS 40.5 Parking 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.

TS 40.6 Emergency Brake

An emergency brake release shall be provided to release the brakes in the event of automatic emergency brake application. The driver shall be able to manually depress and hold down the emergency brake release valve to

release the brakes and maneuver the bus to safety. Once the driver releases the emergency brake release valve, the brakes shall engage to hold the bus in place. Air to the emergency brake release system shall be provided by a dedicated emergency air tank.

TS 41. Interlocks

To prevent opening front and rear passenger doors while the bus is in motion, a speed sensor shall be integrated with the door controls to prevent the front and rear doors from being enabled or opened unless the bus speed is less than 2 mph. Door interlocks shall be disabled by a switch located in the overhead electrical panel.

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 front/rear door enable or open position, or a mid or rear door panel is opened more than 3 in. from the fully closed position (as measured at the leading edge of the door panel). The interlock engagement shall bring the bus to a smooth stop and shall be capable of holding a fully loaded bus on a 6 percent grade, 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 (FMEA) 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 42. Pneumatic System

TS 42.1 General

The bus air system shall operate the air-powered accessories and the braking system with reserve capacity. New buses shall not leak down more than 5 psi over a 15-minute period of time as indicated on the dash gauge.

Provision shall be made to apply shop air to the bus air systems. A quick disconnect fitting shall be easily accessible and located in the propulsion system compartment and near the front bumper area for towing. Retained caps shall be installed to protect fitting against dirt and moisture when not in use. Air for the compressor shall be filtered. The air system shall be protected per FMVSS 121.

TS 42.2 Air Compressor

The air compressor shall be electrically driven and shall be sized to charge the air system from 40 psi to the governor cut-off pressure in less than 4 minutes. Air compressor shall have constant positive intake pressure or be unloaded through the air dryer system.

TS 42.3 Air Lines and Fittings

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J844-Type 1 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844-Type 3B for nylon tubing if not subject to temperatures over 200° F. Accessory and other non-critical lines may use Type 3A tubing. Nylon tubing shall be installed in accordance with the following color-coding standards:

- a) **Green** – Indicates primary brakes and supply
- b) **Red** – Indicates secondary brakes
- c) **Brown** – Indicates parking brake
- d) **Yellow** – Indicates compressor governor signal

- e) **Grey** – Indicates accelerator (if used)
- f) **Black** – Indicates accessories
- g) **Orange** – Indicates fuel

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. Nylon lines may be grouped and shall be supported at 30 in. intervals or less.

The compressor discharge line between powerplant 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.

Shop air shall be provided to the bus air systems through ARO 23903-210, 1/4" MPT shop air connectors at the front and rear of the coach. 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. Tee fitting shall be installed in all air lines regulated by an air pressure regulator for testing for proper pressure.

TS 42.4 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 42.5 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 bus shall be equipped with a SKF Dual Turbo-2000 Air Dryer (or approved equal). The air dryer shall prevent accumulation of moisture in the air system, rated for transit bus applications, and sized to meet all the requirements of the air system. Dryer purge time shall be compatible with the air compressor unload time to guarantee elimination of moisture and all contaminants from the air system. The air-dryer, mounting, location shall be protected by a dust shield. With the exception of the aforementioned dust shield no other bus equipment shall require removal to service the air dryer. The air dryer shall be desiccant type.

TS 43. Electrical, Electrical and Data Communications Systems

TS 43.1 Overview

The electrical system will consist of vehicle battery systems and components that generate, distribute, and store power throughout the vehicle (e.g., generator, voltage regulator, wiring, relays, and connectors).

Electronic devices are individual systems and components that process and store data, integrate electronic information or perform other specific functions.

The data communication system consists of the bidirectional communications networks that electronic devices use to share data with other electronic devices and systems. Communications networks are essential to integrating electronic functions, both on board the vehicle and off.

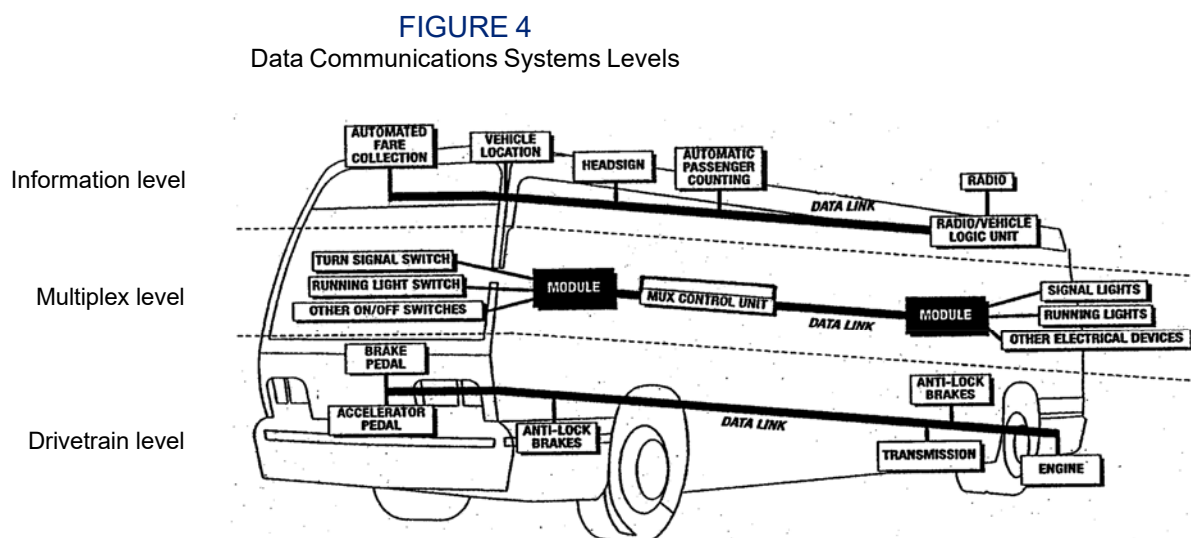
Information level systems that require vehicle information for their operations or provide information shall adhere to J1939 data standard.

Data communications systems are divided into three levels to reflect the use of multiple data networks:

Powertrain level: Components related to the powertrain, including the propulsion system components and anti-lock braking system (ABS), which may include traction control. At a minimum, powertrain components, **ASR** and anti-lock braking systems shall be powered by a dedicated and isolated ignition supply voltage to ensure data communication between components exists when the vehicle ignition is switched to the “on” position.

Information level: Components whose primary function is the collection, control or display of data that is not necessary to the safe drivability of the vehicle (i.e., the vehicle will continue to operate when those functions are inoperable). These components typically consist of those required for automatic vehicle location (AVL) systems, destination signs, fareboxes, passenger counters, radio systems, automated voice and signage systems, video surveillance and similar components.

Multiplex level: Electrical or electronic devices controlled through input/output signals such as discrete, analog, and serial data information (i.e., on/off switch inputs, relay or relay control outputs). Multiplexing is used to control components not typically found on the drivetrain or information levels, such as lights; wheelchair lifts; doors; heating, ventilation and air conditioning (HVAC) systems (if applicable); and gateway devices.



TS 43.2 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 propulsion system compartment wiring harness (es) shall not require pulling wires through any bulkhead or removing any terminals from the wires.

TS 43.3 Environmental 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 shall 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 SAEJ1113 and UNECE Council Directive 95/54(R10).

The Procuring Agency shall follow recommendations from bus manufacturers and subsystem suppliers regarding methods to prevent damage from voltage spikes generated from welding, jumpstarts, shorts, etc.

TS 43.4 Mounting Requirements

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 44 General Electrical Requirement

TS 44.1 Low-Voltage Batteries (24V)

A minimum of two Group 31 AGM batteries conforming to SAE Standard J537 shall be provided. Each battery shall have a minimum of 1150 cold cranking amps. Each battery shall have a purchase date no more than 120 days from the date of release, and shall be fully maintained prior to shipment to the Agency. The battery compartment must be well-ventilated to prevent hydrogen buildup while protecting the compartment from road spray, water intrusion and de-icing chemicals. Five-year replacement warranty.

Positive and negative terminal ends shall be the same size.

TS 44.2 Battery Cables

The battery terminal ends and cable ends shall be color-coded with red for the primary positive, black for negative and another color for any intermediate voltage cables. Positive and negative battery cables shall not cross each other if at all possible, shall be flexible and shall be sufficiently long to reach the batteries with the tray in the extended position without stretching or pulling on any connection and shall not lie directly on top of the batteries. Except as interrupted by the master battery switch, battery and starter wiring shall be continuous cables with connections secured by bolted terminals and shall conform to specification requirements of SAE Standard J1127–Type SGR, SGT, SGX or GXL and SAE Recommended Practice J541, with 2100 strand 4/0 cable or greater recommended.

Color code each voltage.

TS 44.3 Battery Compartment

The battery compartment will include slide outs with stainless steel or equivalent battery trays. The battery compartment shall prevent accumulation of snow, ice and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. The battery compartment temperature should not exceed manufacturer's specification. The vehicle shall be equipped with a 12VDC and 24VDC quick disconnect switch(es). The battery compartment door shall conveniently accommodate operation of the 12VDC and 2 4VDC quick disconnect switch(es).

The battery quick disconnect access door shall be identified with a decal. The decal size shall not be less than 3.5 × 5in. (8.89 × 12.7cm).

The battery hold-down bracket shall be constructed of a non-conductive and corrosion-resistant material (plastic or fiberglass).

TS 44.4 Auxiliary Electronic Power Supply

If required, gel-pack, or any form of sealed (non-venting) batteries used for auxiliary power are allowed to be mounted on the interior of the vehicle if they are contained in an enclosed, non-airtight compartment and accessible only to maintenance personnel. This compartment shall contain a warning label prohibiting the use of lead-acid batteries.

TS 44.5 Master Battery Switch

The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation and prevent corrosion from fumes and battery acid when the batteries are washed off or are in normal service.

Turning the master switch off with the power plant operating, during an emergency, shall shut off the propulsion system and shall not damage any component of the electrical system. The master switch shall be capable of carrying and interrupting the total circuit load.

The batteries shall be equipped with a single switch for disconnecting both 12V and 24V power.

TS 44.6 Low-Voltage Generation 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 name plate 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 44.7 Circuit Protection

All branch circuits, except battery-to-starting motor and battery-to-generator/alternator circuits, shall be protected by current-limiting devices such as circuit breakers, fuses or solid-state devices sized to the requirements of the circuit. 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. Fuses shall be used only where it can be demonstrated that circuit breakers are not practicable. 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 critical to the operation of the bus shall be mounted in a location convenient to the Agency mechanic with visible indication of open circuits. The Agency shall consider the application of automatic reset circuit breakers on a case-by-case basis. The Contractor shall show all in-line fuses in the final harness drawings. Any manually resettable circuit breakers shall provide a visible indication of open circuits. Any manually resettable circuit breakers shall provide a visible indication of open circuits.

Circuit breakers or fuses shall be sized to a minimum of 15 percent larger than the total circuit load. The current rating for the wire used for each circuit must exceed the size of the circuit protection being used.

TS 44.8 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 five ground ring/spade terminal connections shall be made per ground stud with spacing between studs ensuring conductivity and serviceability. Electronic equipment requiring an isolated ground to the battery (i.e., electronic ground) shall not be grounded through the chassis.

TS 44.9 Low Voltage/Low Current 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 wrapping the harness with plastic electrical tape or by sheathing all wires and harnesses with non-conductive, rigid or flexible conduit.

Wiring shall be grouped, numbered and/or color-coded. Wiring harnesses shall not contain wires of different voltage classes unless all wires within the harness are insulated for the highest voltage 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. Grommets or

other protective material shall be installed at points where wiring penetrates metal structures outside of electrical enclosures. Wiring supports shall be protective and non- conductive at areas of wire contact and shall not be damaged by heat, water, solvents or chafing.

To the extent practicable, wiring shall not be located in environmentally exposed locations under the vehicle. Wiring and electrical equipment necessarily located under the vehicle shall be insulated from water, heat, corrosion and mechanical damage. Where feasible, front to rear electrical harnesses should be installed above the window line of the vehicle.

All wiring harnesses over 5 ft. long and containing at least five wires shall include 10 percent (minimum one wire) excess wires for spares. This requirement for spare wires does not apply to 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 propulsion system 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 44.10 Electrical Components

All electrical components, including switches, relays, flashers and circuit breakers, shall be heavy- duty designs with either a successful history of application in heavy-duty vehicles or design specifications for an equivalent environment.

All electric motors shall be heavy-duty brushless type where practical, and have a continuous duty rating of no less than 40,000 hours (except cranking motors, washer pumps and wiper motors). All electric motors shall be easily accessible for servicing.

TS 44.11 Electrical Compartments

All relays, controllers, flashers, circuit breakers and other electrical components shall be mounted in easily accessible electrical compartments. All compartments exposed to the outside environment shall be stainless steel and sealed. The components and their functions in each electrical compartment shall be identified and their location permanently recorded on a drawing attached to the inside of the access panel or door. The drawing shall be protected from oil, grease, fuel and abrasion.

The front compartment shall be completely serviceable from the driver's seat, vestibule or from the outside. "Rear start and run" controls shall be mounted in an accessible location in the propulsion system compartment and shall be protected from the environment.

TS 44.12 Vehicle Charging Stations

The Contractor shall supply and install battery chargers to recharge the propulsion batteries of the electric buses provided under the terms of this contract. The chargers will be located and installed at Durham City Transit Company.

The Contractor shall provide and install the chargers along with all labor and material necessary to make the chargers fully operational. The delivery and installation of the chargers shall be complete prior to the delivery of the first bus, if the chargers are not vehicle mounted (not by internal combustion engines). Contractor is responsible for the design, utility coordination if necessary and permitting of the system.

One charger per bus shall be provided.

Installed chargers shall meet all applicable codes and manufacturer recommendations.

The bus shall be equipped with a two charge socket connections, accessible on the outside of the vehicle, allowing a supplied charging cable to be attached to the bus. Inside the vehicle, power shall be distributed through a main distribution panel with individual circuit breakers and RCD/GFCI protection on the input to the charging module or modules. Each charger circuit shall also be protected on the output stage to the battery pack or packs.

The installed chargers shall be designed and installed in such way that a single DCTC employee can safely connect (and disconnect) the charger(s) to the bus(es) without the need for a ladder or any special tools.

Installed chargers shall be specifically designed for charging the propulsion batteries installed on the buses provide under this contract.

On-site training for DCTC employees on the use, maintenance, and repair of the chargers shall be included with any contract, after DCTC approved installation. Ten (10) copies of Instruction Manuals and Maintenance/Repair Manuals shall be delivered to DCTC after approved installation is complete. Any necessary consumable products associated with the use of these chargers for one year shall be provided.

Any necessary equipment and tools necessary to maintain the chargers shall be provided.

Chargers shall be capable of bringing propulsion batteries from a state of 0% charge to a state of sufficient charge to complete one round trip run charge in less than 15 minutes and fully charged (100%) in less than 6 hours.

Chargers or vehicles shall have indicating lights or a display that very clearly display the state of operation the charger is in (e.g., charging, not charging, etc.) and also display the percentage of charge the batteries are in (e.g., 65% charged).

Chargers shall have an emergency shut off switch that is clearly marked, easily accessible and easily operable.

The chargers shall be UL listed

The chargers shall be equipped with suitably rated (electrically) cables to properly charge a nearby parked bus. Cables and connectors shall be resistant to oil, diesel fuel, and other corrosives found in DCTC bus garages.

The connector to the bus shall have a locking mechanism, ensuring the connector will not come loose or fall by incidental contact.

There shall be a means of storing the cable, neatly, while the charger is not in use.

The chargers shall be mounted in such a way that three (3) inches of standing water will not adversely affect the operation of the charger.

The charger shall utilize the existing electrical and structural infrastructure at the DCTC garage. Any modifications to the existing facility to adapt and install the charger to meet the requirements of this document shall need written approval of DCTC and shall be the sole responsibility of the contractor. Contractor shall submit power requirements with bid documents.

All modifications to the facility shall be in accordance of applicable codes, ordinances and manufacturer's recommendations and shall meet DCTC approval.

Contractor shall provide detailed wiring diagrams for the charger including controls.

Immediately upon charging circuit activation and until the recharging period is complete, the connected bus shall be automatically rendered inoperable. The bus shall remain inoperable until disconnected from the charger. Recharging of the bus must be dependent on the bus being completely stationary with the parking brake of the bus engaged. The charger shall be a completely self-contained package, designed for 24-hour operation and suitable for outdoor use. Connection of the charger to any electric bus provided under the terms of this contract shall be made without climbing on the roof of the bus.

The charger shall be capable of operating continuously without performance or safety degradation in environmental conditions common to the Durham area and DCTC bus garage environment. Common environmental conditions include an ambient temperature range of 20°F to 115°F, at relative humidity between 5-percent and 100- percent. Chargers shall be mounted in such a way so as to prevent water, from floor washers or bus run off, entering the base of the units. If chargers are vehicle mounted, they shall be installed in such a way to prevent debris, water, salt, etc. from entering the unit.

Outdoor chargers, if necessary, shall comply with all applicable codes and standards. If an inductive type is proposed, proposers must explain in details the proposed system, design, construction requirement, proposed location, locations previously installed, and cost benefit analysis.

Any charging system installed under this contract shall be metered separately to enable DCTC to generate energy consumption reports and costs.

Contractor shall supply spare parts and any specialized tools and equipment necessary for the operation and maintenance of the System.

TS 45 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 45.1 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 45.2 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 45.3 Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable.

NOTE: A shield grounded at both end forms a ground loop, which can cause intermittent control or faults.

When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.

TS 45.4 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 45.5 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 45.6 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 46 Multiplexing

TS 46.1 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, and 24V), at each module location shall be designated as spares.

TS 46.2 Electrical Compartments

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 46.3 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 47 Data Communications

TS 47.1 General

All data communication networks shall be either in accordance with a nationally recognized interface standard, such as those published by SAE, IEEE or ISO, or shall be published to the Agency with the following minimum information:

- Protocol requirements for all timing issues (bit, byte, packet, inter-packet timing, idle line timing, etc.) packet sizes, error checking and transport (bulk transfer of data to/from the device).
- Data definition requirements that ensure access to diagnostic information and performance characteristics.
- The capability and procedures for uploading new application or configuration data.
- Access to revision 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.

TS 47.2 Drivetrain Level

Drivetrain components, 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 47.3 Diagnostics, Fault Detection and Data Access

Drivetrain performance, maintenance and diagnostic data, and other electronic messages shall be formatted and transmitted on the communications networks.

The drivetrain level shall have the ability to record abnormal events in memory and provide diagnostic codes and other information to service personnel. At a minimum, this network level shall provide live/fail status, current hardware serial number, software/data revisions and uninterrupted timing functions.

TS 47.4 Programmability (Software)

The drivetrain level components shall be programmable by the City with limitations as specified by the sub-system Supplier.

TS 47.4 Programmability (Software)

The drivetrain level components shall be programmable by the City with limitations as specified by the sub-system Supplier.

TS 48 Multiplex Level

TS 48.1 Data Access

At a minimum, information shall be made available via a communication port on the multiplex system. The buses should be equipped with a Dinex G4 system (or approved equal). The location of the communication port shall be easily accessible. A hardware gateway and/or wireless communications system are options if requested by the DCTC. The communication port(s) shall be located as specified by the DCTC.

TS 48.2 Diagnostics and Fault Detection

The multiplex system shall have a proven method of determining its status (system health and input/output status) and detecting either active (online) or inactive (offline) faults through the use of on-board visual/audible indicators. In addition to the indicators, the system shall employ an advanced

diagnostic and fault detection system, which shall be accessible via either a personal computer or a handheld unit. Either unit shall have the ability to check logic function. The diagnostic data can be incorporated into the information level network or the central data access system.

No requirement for mock-up board. However, pricing for a mock up board should be provided as an option.

TS 48.3 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 48.4 Electronic Noise Control

Electrical and electronic subsystems 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 subsystems on the coaches shall not be affected by external sources of RFI/EMI. This includes, but is not limited to, radio and TV transmission, portable electronic devices including computers in the vicinity of or on-board the buses, AC or DC power lines and RFI/EMI emissions from other vehicles.

TS 49. Driver's Area Controls

TS 49.1 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 49.2 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 49.3 Visors/Sun Shades

Adjustable sun visor(s) shall be provided for the driver's windshield and the driver's side window. Visors shall be shaped to minimize light leakage between the visor and windshield pillars. Visors shall store out of the way and shall not obstruct airflow from the climate control system or interfere with other equipment, such as the radio handset or the destination control. Deployment of the visors shall not restrict vision of the rearview mirrors. Visor adjustments shall be made easily by hand with positive locking and releasing devices and shall not be subject to damage by over-tightening. Sun visor construction and materials shall be strong enough to resist breakage during adjustments. Visors may be transparent but shall not allow a visible light transmittance in excess of 10 percent. Visors, when deployed, shall be effective in the driver's field of view at angles more than 5 deg above the horizontal.

TS 49.4 Driver Hand Controls

All switches and controls necessary for the safe operation of the bus shall be conveniently located in the operator's area and shall provide for ease of operation. Switches and controls shall be 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. Operational controls, instrumentation, switches, and other system controls shall not be mixed with ventilation diffusers and non-operational controls or readouts. Controls shall be located so that boarding passengers may not easily tamper with control settings.

The door control, kneel control, windshield wiper/washer controls, and run switch shall be in the most convenient operator locations. They shall be identifiable by shape, touch, and permanent markings. Doors shall be operated by a single control, conveniently located and operable in a horizontal plane by the operator's left hand. The setting of this control shall be easily determined by position and touch.

All dash lights shall be LED. All panel-mounted switches and controls shall be marked with easily read identifiers. Text designating position (on/off) shall be a minimum of 9 points, identifying legends shall be a minimum of 11 points. Extremely condensed or italic type fonts shall not be used. Graphical 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. Red type on a black or gray field (or vice versa) shall not be used. Mechanical switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from the vestibule or the operator's seat or through an exterior access panel located below the driver's window. Actual switches, controls, instruments, and access panels shall be adequately sealed and protected to prevent dust or moisture damage.

TS 49.5 Normal Bus Operation Instrumentation and Controls

The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the operator. The operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.

Systems or components monitored by onboard diagnostics system shall be displayed in clear view of the operator and provide visual and/or audible indicators. The intensity of indicators shall permit easy determination of on/off status in bright sunlight but shall not cause a distraction or visibility problem at night. All indicators shall be illuminated using backlighting.

The indicator panel shall be located in Area 1 or Area 5, within easy view of the operator instrument panel. All indicators shall have a method of momentarily testing their operation. The audible alarm shall be tamper-resistant and shall have an outlet level between 80 and

83 dBA when measured at the location of the operator's ear.

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. The intent of the overall physical layout of the indicators shall be in a logical grouping of systems and severity nature of the fault.

Consideration shall be provided for future additions of spare indicators as the capability of onboard diagnostic systems improves.

The Side Console Assembly shall contain the following switches, all of which shall have lighted legends.

- Master Switch: 4-position rotary switch identified with lighted legend "Stop", "Run", "Night", and "Park" marked on the panel, in accordance with FMVSS requirements.
- Hazard Warning: 2-position On-Off toggle switch with lighted hazard symbol. Legend to be "Hazard" or symbol
- Defroster: A minimum of 3-position toggle switch having "Low-Off-High" position. Legend to be "Defroster"
- Driver Heater Control
- Public Address System switch
- Chime Switch: 2-position toggle switch having "On-Off" positions with legend "Chime"
- Interior light Switch: 3-position toggle switch having "All-Off-Rear" positions with legend "Interior Lights"
- Drivers area light switch
- Radio "Emergency Call" switch. No legend allowed. Locate in sidewall panel near driver's left knee position
- Door control handle
- Switch for fan for defrosting the windshield
- Fire Suppression System Controls – The detection and fire suppression control console shall be mounted at the rear of the side console
- Air Conditioning Controls – if separate from the heater controls

TS 49.6 Instrument Panel

All included gauges and layout options will be discussed at the pre-production meeting.

TS 49.7 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 49.8 Pedal Angle

The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 35 to 50deg at the point of initiation of contact and extend downward to an angle of 8 to 18deg 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 49.9 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 49.10 Brake and Accelerator Pedals

The preferred adjustable throttle & brake pedal shall be a Kongsberg (or approved equal).

TS 49.11 Driver Foot Switches

Floor Mounted Foot Control Platform

The angle of the turn signal platform shall be determined from a horizontal plane, regardless of the slope of the cab floor. The turn signal platform shall be angled at a minimum of 10 deg and a maximum of 37 deg. It shall be located no closer to the seat front than the heel point of the a Turn Signal Controls

Turn Signal Controls

Turn signal controls shall be floor-mounted, foot-controlled, water-resistant, heavy-duty, momentary contact switches.

Foot Control Switch

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 directionals shall be momentary type, while those for the PA system and the high beam shall be latching type. The spacing of the switches shall be such that inadvertent simultaneous deflection of switches is prevented.

Other Floor-Mounted Controls

The following may be floor mounted, momentary or latching, as identified by the Procuring Agency:

- Hazard
- Silent alarm
- PA system

TS 50. Driver's Amenities

TS 50.1 Coat Hook

A hook and loop shall be provided to secure the driver's coat.

TS 50.2 Storage Boxes/Garbage Bin and Bracket

An enclosed driver storage area shall be provided with a positive latching door and/or lock. The minimum size is 27 in.

The preferred curbside storage box is a (Black Southco Thumb trigger lock without key) Or approved equal. Box shall be mounted on the CS wheel well.

Removable black plastic garbage bin and stainless steel bracket mounted off CS wheel well hand rail.

Display / Schedule Holder an OBIC 19/21 4P1L with welcome aboard logo mounted on street side front

wheel well storage box.

TS 51. Windshield Wipers and Washers

TS 51.1 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.

TS 51.2 Intermittent Wiper and Variable Control

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 51.3 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 52. Driver's Seat

TS 52.1 Dimensions

The driver's seat shall be a Recaro Ergo Metro Transit Seat (or approved equal) comfortable, and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus.

TS 52.2 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 52.3 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 52.4 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 52.5 Seat Base Fore/AFT/Adjustment

Measurement is the horizontal distance from the heel point to the front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (approximately 15 in.). On all low-floor buses, the seat base shall travel horizontally a minimum of 9 in. It shall adjust no closer to the heel point than 6 in. On all high-floor buses, the seat base shall travel a minimum of 9 in. and adjust no closer to the heel point than 6 in.

TS 52.6 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 52.7 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. Rubber bumpers shall be provided to prevent metal-to-metal contact.

TS 52.8 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

Headrests – Adjustable headrests

TS 52.9 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 52.10 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 degrees-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 52.11 Seat Belt

The belt assembly should be an auto-locking retractor (ALR). All seat belts should be stored in automatic retractors. The belts shall be mounted to the seat frame so that the driver may adjust the seat without resetting the seat belt. The seat and seat belt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210.

Lap and Shoulder (Three-Point) Seat Belt

Seat belts shall be provided across the driver's lap and diagonally across the driver's chest. The driver shall be able to use both belts by connecting a single buckle on the right side of the seat cushion. 3-pt seatbelts must be emergency locking retractor (ELR) in design. Adjustable-height D-ring. All seatbelt assemblies shall come equipped with a warning switch device to remind operators to buckle up. Orange three-point seatbelt webbing.

Lap Belt Length

The lap belt assembly shall be a minimum of 72 in. in length.

TS 52.12 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 52.13 Seat Structure and Materials

Cushions shall be fully padded with at least 3 in. of materials in the seating areas at the bottom and back, and contain foam and fabric that meets FTA Docket 90A. Pedestal shall be made of stainless steel.

TS 53. Mirrors

TS 53.1 Exterior Mirrors

The bus shall be equipped with a 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. Spring loaded mirror heads auto return.

TS 53.2 Flat Mirrors on Both Sides

The bus shall be equipped with two flat outside mirrors, each with not less than 50 sq. in. of reflective surface. The mirrors shall be located so as to provide the driver a view to the rear along both sides of the bus and shall be adjustable both in the horizontal and vertical directions to view the rearward scene. The roadside rearview mirror shall be positioned so that the driver's line of sight is not obstructed.

TS 53.3 Curbside Mirror

The curbside rearview mirror shall be mounted so that its lower edge is no less than 76 in. above the street surface. A lower mount may be required due to requested mirror configuration requests.

Remote Adjustment of Curbside Mirror

The driver shall be able to adjust the curbside mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

Heated Curbside Mirrors

The curbside mirrors shall have heaters that energize whenever the driver's heater and/or defroster is activated or activated independently.

TS 53.4 Street-Side Mirror

The driver shall be able to adjust the street-side mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

Heated Street-Side Mirrors

The street-side mirrors shall have heaters that energize whenever the driver's heater and/or defroster is activated, or can be activated independently.

TS 54. Windows

TS 54.1 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 54.2 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-degree

requirement, provided that the divider does not exceed a 3-degree angle in the operator's field of view. Windshield pillars shall not exceed 10 degrees of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded-in-place windshields shall not be used. Winglets may be bonded.

TS 54.3 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 1A and the Recommended Practices defined in SAE J673.

Shaded Band

The upper portion of the windshield above the driver's field of view shall have a dark, shaded band with a minimum luminous transmittance of 5 percent when tested in accordance to ASTM D-1003.

TS 54.4 Driver's Side Window

The driver's side window shall be full sliding type, requiring only the rear half of the sash to latch upon closing. 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. (840 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 27.2 in. (560 mm) above the operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.

The driver's side window glazing material shall have a ¼ in. nominal thickness tempered safety glass conforming to the requirements of ANSI Z26.1-1996 Test Grouping AS-2 and the recommended practices defined in SAE J673.

The design shall prevent sections from freezing closed in the winter. Light transmittance shall be 75 percent on the glass area below 53 in. from the operator platform floor.

TS 54.5 Side Windows

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 propulsion system operation or normal road excitation is not apparent. All aluminum and steel material will be treated to prevent corrosion.

Emergency Exit (EGRESS) Configuration

All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.

Standard Passenger Side Window Configurations

- Hidden frame
- Openable windows with inward-opening or sliding transom panels

All side windows, except windows in passenger doors and those smaller than 500 sq. in., shall have window panels that are operable by passengers.

Operable window panels shall be equipped with latches that secure the window in the fully open and fully closed positions.

Materials

Laminated Glazing Panels

Side window glazing material shall have a minimum 3/16 in. nominal thickness. The material shall conform with the requirements of ANSI Z26.1-1996, "Standard for Type AS-5 Safety Glazing Materials," except for Test Number 17, which shall subject the specimens to 100 cycles with less than 4 percent hazing and 500 cycles with less than 12 percent hazing. Windows shall be laminated safety glass.

Windows on the bus sides and in the rear door shall be tinted a neutral color, complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 37 percent, as measured by ASTM E-424. Luminous transmittance shall be measured by ASTM D-1003. Windows over the destination signs shall not be tinted.

Maximum solar energy transmittance shall be fifty (50) percent gray as measured by ASTM E-424.

NOTE: All glass treatments must be permanent, within the glass and/or in the center membrane. Surface films are not permitted.

SHGC and light transmission performance shall be defined by the National Fenestration Rating Council.

TS 55. Heating, Ventilating and Air Conditioning

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. The HVAC system shall be a Thermo-King (or approved equal).

The system shall be a fully AC high-voltage electric-driven A/C system with full hermetic AC compressor, condenser fan, evaporator blower motors and brushless AC generators.

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.

TS 55.1 Capacity and Performance Requirements

The air-conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 115 to 95 °F in less than 20 minutes after start-up. Temperature shall be within the normal operating range at the time of start-up of the cool-down test, which may be activated by a driver-controlled device.

During the cool-down period, the refrigerant pressure shall not exceed safe high-side pressures and the condenser discharge air temperature, measured 6 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,” shall be used.

The air conditioning system shall meet these performance requirements using the current industry standard refrigerant.

TS 55.2 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.

Coolant shall be delivered to the HVAC system driver’s defroster/heater and other heater cores by means of an auxiliary coolant pump, sized for the required flow, which is 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.

TS 55.3 Manually Adjustable Temperature Control Set Point

The climate control system shall have the provision to allow the driver to adjust the temperature control set point at a minimum of between 68 and 72 °F. From then on, all interior climate control system requirements shall be attained automatically, unless re-adjusted by the driver.

The driver shall have full control over the defroster and driver’s heater. The driver shall be able to adjust the temperature in the driver’s area through air distribution and fans. The interior climate control system shall switch automatically to the ventilating mode if the refrigerant compressor or condenser fan fails.

Interior temperature distribution shall be uniform to the extent practicable to prevent hot and/or cold spots. After stabilization with doors closed, the temperatures between any two points in the passenger compartment in the same vertical plane, and 6 to 72 in. above the floor, shall not vary by more than 5 °F with doors closed. The interior temperatures, measured at the same height above the floor, shall not vary more than ± 5 °F from the front to the rear from the average temperature determined in accordance with APTA’s “Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System.” Variations of greater than ± 5 °F will be allowed for limited, localized areas provided that the majority of the measured temperatures fall within the specified requirement.

TS 55.4 Auxiliary Heater

Option pricing for auxiliary heaters shall be provided to supplement the interior cabin heat and shall have an output necessary to meet the performance criteria specified in Section 7.55.

TS 55.5 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 55.6 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 55.7 Controls for the Climate Control System (CCS)

The controls for the driver's compartment for heating, ventilation and cooling systems shall be integrated and shall meet the following requirements:

- The heat/defrost system fan shall be controlled by a separate switch that has an "off" position and at least two positions for speed control. All switches and controls shall preclude the possibility of clothing becoming entangled, and shields shall be provided, if required. If the fans are approved by the Agency, an "on/off" switch shall be located to the right of or near the main defroster switch.
- A manually operated control valve shall control the coolant flow through the heater core.
- If a cable-operated manual control valve is used, then the cable length shall be kept to a minimum to reduce cable seizing. Heater water control valves shall be "positive" type, closed or open. The method of operating remote valves shall require the concurrence of the Agency project manager.

TS 55.8 Driver's Compartment Requirements

A separate heating, ventilation and defroster system for the driver's area shall be provided and shall be controlled by the driver. The system shall meet the following requirements:

- The heater and defroster system shall provide heating for the driver and heated air to completely defrost and defog the windshield, driver's side window, and the front door glasses in all operating conditions. Fan(s) shall be able to draw air from the bus body interior and/or exterior through a control device and pass it through the heater core to the defroster system and over the driver's feet. A minimum capacity of 100 cfm shall be provided. The driver shall have complete control of the heat and fresh airflow for the driver's area.
- The defroster supply outlets shall be located at the lower edge of the windshield. These outlets shall be durable and shall be free of sharp edges that can catch clothes during normal daily cleaning. The system shall be such that foreign objects such as coins or tickets cannot fall into the defroster air outlets. Adjustable ball vents or louvers shall be provided at the left of the driver's position to allow direction of air onto the side windows.

A ventilation system shall be provided to ensure driver comfort and shall be capable of providing fresh air in both the foot and head areas. Vents shall be controllable by the driver from the normal driving position. Decals shall be provided, indicating "operating instructions" and "open" and "closed" positions. When closed, vents shall be sealed to prevent the migration of water or air into the bus.

TS 55.9 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 resistance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service. Air filters shall be cleanable.

TS 55.10 Roof Ventilations

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.

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.

TS 55.11 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 display modules or gauges to be located in the return air area.

TS 55.12 Floor-Level Heating

No requirements for floor-level heating.

TS 56. Exterior Panels

TS 56.1 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.

TS 56.2 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.

TS 56.3 Pedestrian Safety

Exterior protrusions along the side and front of the bus greater than ½ in. and within 80 in. of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors, cameras and required lights and reflectors are exempt from the protrusion requirement. Advertising frames shall protrude no more than ⅞ in. from the body surface. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize toeholds or handholds. Exterior protrusions shall not cause a line-of-sight blockage for the driver.

TS 56.4 Side Body Panels

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 56.5 Rain Gutters

Rain gutters shall be provided to prevent water flowing from the roof onto the passenger doors and driver's side window. When the bus is decelerated, the gutters shall not drain onto the windshield, driver's side window or door boarding area. Cross sections of the gutters shall be adequate for proper operation.

TS 56.6 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.

TS 56.7 Fender Skirt

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 56.8 Splash Aprons

Splash aprons, composed of ¼ in. minimum composition or rubberized fabric, shall be installed behind and/or in front of wheels as needed to reduce road splash and to protect underfloor components. The splash aprons shall extend downward to within 6 in. off the road surface at static conditions. Apron widths shall be no less than tire widths. Splash aprons shall be bolted to the bus understructure. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. The flexible portions of the splash aprons shall not be included in the road clearance measurements. Splash apron shall be installed as necessary to protect the wheelchair loading device from road splash. Other splash aprons shall be installed where necessary to protect bus equipment.

TS 56.9 Access Doors

Conventional or pantograph hinged doors shall be used for the propulsion system compartment and for all auxiliary equipment compartments, including doors for checking the quantity and adding to the coolant, lubricants and 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.

An access door should be available on the interior rear location of the bus for easy access to the propulsion system compartment. The rear passenger seats should flip up to allow access.

If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.

TS 56.10 Access Door Latch/Locks

Access doors larger than 100 sq. in. in area shall be equipped with corrosion-resistant flush-mounted latches or locks except for coolant and fuel fill access doors. All such access doors that require a tool to open shall be standardized throughout the vehicle and will require a nominal 5/16 in. square male tool to open or lock.

TS 56.11 Bumper 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 56.12 Front Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 5mph 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 4000lbs parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5mph impacts into the corners at a 30deg 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.

TS 56.13 Rear Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 2mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper 2 ft. wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to 5 mph, over pavement discontinuities up to 1 in. high, and at accelerations up to 2 mph/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 30degangle 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 56.14 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 56.15 Bike Rack

Sportsworld DL2 (or approved equal) stainless steel bike rack will be installed on the front bumper. A warning light indicating bike rack deployment should be provided in the dash.

TS 57. Finish and Color

TS 57.1 Appearance

All exterior surfaces shall be smooth and free of visible fasteners, wrinkles, and dents. Exterior surfaces to be painted shall be properly cleaned and primed as appropriate for the paint used, prior to application of paint to

assure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Paint and clear coat shall be applied using DuPont acrylic urethane paint (or approved equal) with a minimum gloss of ninety (90), measured at twenty (20) degrees as defined in ASTM D523. Proper adhesion between the basic surface and successive coats of the original paint shall be measured using a Cross Hatch Adhesion Test as outlined in ASTM D3359B. All paint shall be applied smoothly and evenly with the finished surface free of dirt, runs, orange peel, and other imperfections. All exterior finished surfaces shall be impervious to diesel fuel, gasoline, natural gas and commercial cleaning agents. Finished surfaces shall not be damaged by controlled applications of commonly used graffiti-removing chemicals. The Manufacturer shall prepare a paint coating and application document containing procedures for surface cleaning and preparation, priming, surfacing, and painting for the bus body and all equipment that is painted or powder coated. A detailed paint schedule showing the equipment painted, paint type and manufacturers, recommended thickness, and other pertinent information shall also be included. This document shall be submitted for review at the pre-production meeting and shall be part of the maintenance manuals.

- Pricing for paint should be for two paint passes and additional paint passes should be provided as an option. Less than two paint passes will require a credit to be given and this should be provided in the options.

Any equipment or parts of equipment which would be damaged or suffer impaired operation from painting shall not be painted and shall be corrosion-resistant. Excluding original manufacturer painting the following items shall not be painted:

- Wire and cable
- Heat transfer surfaces
- Electrical insulators
- Elastomeric portions of air and refrigerant lines
- Grounding pads
- Elastomeric parts
- Grease fittings
- Linkages
- Threaded parts used for adjustments
- Electrical equipment
- Wearing surfaces

TS 57.2 Decals Numbering and Signage

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 appliques. 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, 38.28.

TS 57.3 Passenger Information

ADA priority seating signs as required and defined by 49 CFR shall be provided to identify the seats designated for passengers with disabilities.

Requirements for a public information system in accordance with 49 CFR shall be provided.

TS 58. Lighting

TS 58.1 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.

Light Emitting Diode (LED) lights shall be utilized for all applications where certified LED lights are available

and shall be Dialight (or approved equal). LED lights shall be constructed with a single piece lens with the cavity seal accomplished via a potting process, a welded lens to housing construction is not allowed. All electrical connections to the LED light shall be by wire coming directly from the light housing and terminated with a Packard Weather Pak (or approved equal) connector. No interim connector shall be allowed on the body of the light. Exterior surfaces of light lenses shall be smooth to prevent dirt accumulation and ease the washing process. Lights mounted on the propulsion system compartment doors shall be protected from the impact shock of door opening and closing.

Lights mounted on the roof or upper sections of the bus shall have protective shields, armored, or be flush mounted to protect the lens. LED's shall be protected from chemical and abrasion degradation.

Location of all exterior lighting will be approved during the pre-production meeting.

TS 58.2 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 58.3 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 58.4 Turn Signals

Turn-signal lights shall be provided on the front, rear, curb and street sides of the bus in accordance with FMVSS regulations.

TS 58.5 Headlamps

Headlamps shall be designed for ease of replacement. Headlamps shall be LED. The preferred headlamp is a Dialight LED Headlamp (or approved equal).

TS 58.6 Exterior LED "STOP" Light

The bus shall include an LED "STOP" light on the rear-middle of the bus, above the tailgate. The lighting (in red) will illuminate the word "STOP" when the vehicle brakes are applied.

TS 58.7 Deceleration Lights/Brake Lights

Bus shall include amber high and center mount lamp(s) along the backside of the bus that illuminate steadily when the transmission is in forward mode and when the throttle is completely released (0 percent engagement). The amber lamps shall automatically extinguish, regardless of transmission and throttle condition, with brake application. Operation of the amber lamps shall be programmable with the multiplex system. Agency to specify the size of the high and center mount, amber lamp(s). Brake lights shall be provided in accordance with federal regulations.

TS 58.8 Service Area Lighting (Interior and Exterior)

LED lamps shall be provided in all 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 propulsion system 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.

Propulsion system 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 30 minutes to prevent damage caused by inadvertently leaving the service area lighting switch in the "on" position after repairs are made.

TS 58.9 Interior Lighting

The light source shall be located to minimize windshield glare, with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display.

All interior lighting shall be LED's, and shall be adjustable. Overhead lighting shall provide general illumination in the passenger compartment and shall be controlled by a three (3) position switch convenient to the driver with the following functions:

- ALL – All passenger lights on
- OFF – All passenger lights off
- REAR – Rear passenger lights on

The forward most light on the curbside of the bus shall be extinguished when the front door is closed to reduce driver windshield glare with lower light intensities permitted for the curbside front aisle facing seats.

Light fixtures shall be located above the side windows at or near the juncture of the bus ceiling and the sidewall and may be provided over the rear door. Safety mechanism shall prevent fixtures from falling more than eight (8) inches upon occurrence of a mounting failure.

Lighting shall not be installed above the driver's side window and the front door. Lamp fixtures and lenses shall be fire-resistant and compliant to NFPA 130 requirement for lighting fixtures and shall not drip flaming material onto seats or interior trim if burned. Advertising media located in this area shall be illuminated by direct lighting. No advertisement frames shall be illuminated from behind the media.

The fixtures shall be sealed to prevent accumulation of dust and insects but shall be easily opened on hinges for cleaning and service. The lenses shall be retained in a closed position with fasteners captive in the lens that are tamper-proof consistent with all other fasteners within the bus.

Power supplies shall be enclosed with fireproof material and shall be located at the individual light fixtures. Power supplies, if required, shall be inaudible with an operating frequency above 18,000 Hz. Interchangeability of lamps, lens fixtures, and power supplies shall be maximized. Thermal protected, individually fused ballast with replaceable fuses shall be hard wired to the lamps and power source utilizing a mechanical connection, soldered and protected by heat shrink insulation. The interior lighting system circuit(s) shall be designed so that the failure, degradation or overheating of one lighting fixture will trip a circuit breaker.

The lights shall be shielded to protect passengers' eyes from glare. Light fixtures shall be totally enclosed, water tight, and manufactured from a non-corrosive material designed to provide ease of cleaning as well as lamp and housing removal, and shall not be easily removable by passengers. Doorway and step lights shall be protected from damage caused by passengers kicking lenses or fixtures and shall not be a hazard to passengers.

- Option pricing will be provided for colored light lenses. Both red and blue lens colors will be provided.

TS 58.10 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 58.11 Seating Area

The interior overhead LED lighting system shall be extinguished when the transmission is in reverse. The system shall provide no less than fifteen (15) foot-candles of illumination on a one (1) square-foot plane at an angle of forty-five (45) degrees centered thirty-three (33) inches above the floor and twenty-four (24) inches in front of the seat back at each seating position except at the rear cross seat where the illumination may be decreased to seven (7) foot-candles.

TS 58.12 Vestibules/Doors

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" position. Rear exit area and curb lights shall illuminate when the rear door is unlocked.

TS 58.13 Step Lighting

A doorway and rear step lighting system shall be illuminated when the master switch is in RUN and NIGHT RUN positions, except the front doorway which shall be extinguished when the front door is closed. Illumination shall be provided by LED strip lighting at both locations. The system shall provide no less than two (2) foot-candles of illumination on the steps and in the entry and exit areas or on the ramp when deployed.

TS 58.14 Ramp Lighting

Exterior and interior ramp lighting shall comply with ADA regulations Part 38.31.

TS 58.15 Farebox Lighting

A LED light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox. This light will automatically come on whenever the front doors are opened and the run switch is in the "night run" or "night park" position.

TS 59. Interior Panels and Finishes

TS 59.1 General

Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Removal of fixtures or equipment unrelated to the repair task to gain access shall be minimized. Access doors shall be hinged with positively retained props to hold the doors out of the mechanic's way. Access doors shall have top mounted hinges with positively retained props to ensure doors do not inhibit service personnel's work. The retaining props shall be safety latched to prevent accidental door closure in the event of a prop failure. Retention of all interior access panels, except on the door actuator compartments, shall be with tamper-proof fasteners.

There shall be interior access to components and air conditioning system where applicable. Such access shall consist of no less than three (3) removable panels in the following locations:

- Rear bulkhead panel at the air return
- Top of the rear settee (with captive fasteners)
- Lower front section of rear settee (with captive fasteners)

Panel fasteners shall be standardized so that only one tool is required to service all fasteners within the bus, which shall be tamper-proof. Access doors for the door actuator compartments shall be secured with hand screws or latches, and shall prevent entry of mechanism lubricant into the bus interior. All fasteners that retain access panels shall be captive in the cover.

TS 59.2 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 passenger. These panels shall be mounted using stainless steel frames.

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 with stainless steel frame and mounted on the sidewall. They shall project toward the aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend from at least the window opening of the side windows, and those forward of transverse seats shall extend downward to 1 and 1½ in. above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways, where applicable, shall provide no less than a 2½ in. clearance between the modesty panel and a fully open, inward opening door, or the path of a deploying flip-out ramp to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with stainless steel 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 59.3 Floor Panels

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Access openings shall be nonsymmetrical so that the flooring shall be properly aligned after reinstallation. Fasteners shall tighten flush with the floor. All interior access doors and related fasteners are subject to approval at the pre-production meeting.

The number of special fastener tools required for panel and access door fasteners shall be minimized.

TS 59.4 Composite Subfloor/Covering

The composite subfloor shall be reasonable level throughout and all joints between the floor and vertical surfaces shall have a stainless steel trim to secure the floor covering. Composite subfloor shall be huck-bolted to the chassis (not screwed).

RCA rubber floor covering (or approved equal) shall have a non-skid walking surface that remains effective in all weather conditions. The floor covering shall have minimal ribbing to facilitate cleaning and meet the requirements of the National Floor Safety Institute (NFSI) standards. Landing area and step edges are to be yellow safety vinyl edging. Floor covering shall be high quality without major failure or degradation. Floor and step treads if applicable with coverings applied, shall withstand a static load of at least 150 pounds applied through the flat end of a one-half (1/2) inch diameter rod, with 1/32-inch radius, without permanent visible deformation. The minimum floor thickness shall be no less than 2.7 millimeters, and all seams shall be heat welded to provide greater durability and waterproofing. Color shall be consistent throughout the thickness of the floor covering. Color of the floor covering will be approved at the pre-production meetings.

The methodology and the type of adhesive used to bond the floor covering to the bus floor shall be as recommended by the manufacturer of the floor covering. All seams and edges of the floor covering shall be sealed to prevent water from entering between floor and covering. The floor covering seams shall be a minimum of eight (8) inches from seams in the sub-floor material.

TS 59.5 Fare Collections Area

Space and structural provisions shall be made for installation of a GFI Odyssey or GFI Fast Fare collection system (or approved equal), which shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The farebox shall not restrict access to the driver 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 clear area for access to the driver's area shall be a minimum of ten (10) inches when measured from the farebox to the driver's seat base. The floor under the fare collection equipment shall be reinforced with one-quarter (1/4) inch steel (minimum) to provide a sturdy mounting platform to prevent shaking of the equipment while the bus is in operation. Contractor shall provide fare collection installation layout to the Agency for approval.

TS 60. Passenger Seating

TS 60.1 Arrangements and Seat Style

The Manufacturer shall provide the Procuring Agency with seating layouts showing all seating positions, dimensions, locations, aisle widths, floor contours, and all other pertinent interior dimensions of the bus being proposed for review and approval by the Procuring Agency.

A 30' 35' 40' bus with a rear door must be capable of having the maximum passenger seating positions available for each size of bus. Rearward facing seats are not permitted.

The center three rear bench seats shall be hinged at the top of the seat back allowing the entire assembly to lift out of the way for servicing the propulsion system compartment if access is required through the passenger compartment. The two remaining rear bench seats shall be fixed in position. Hinged seat assembly shall be equipped with locks requiring no tools to open and prop rod to hold the seat assembly in an open position.

Seating on both sides behind the front wheelhouses shall be flip-type aisle-facing seats and designated as priority seating for elderly and persons with disabilities and appropriately labeled with a priority seating decal.

TS 60.2 Seats

The seats shall be American Seating InSight Prime Plus (or approved equal) equipped with upholstered vandal resistant inserts with a drain hole throughout the bus.

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.

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 may have less than fourteen (14) inches if the seating is designed to allow the passenger to rest their feet on an angled portion of the wheel housing, but shall have foot room no less than nine inches. Thickness of the transverse seat backs shall be designed to allow optimum passenger knee room and bus capacity.

AISSLES

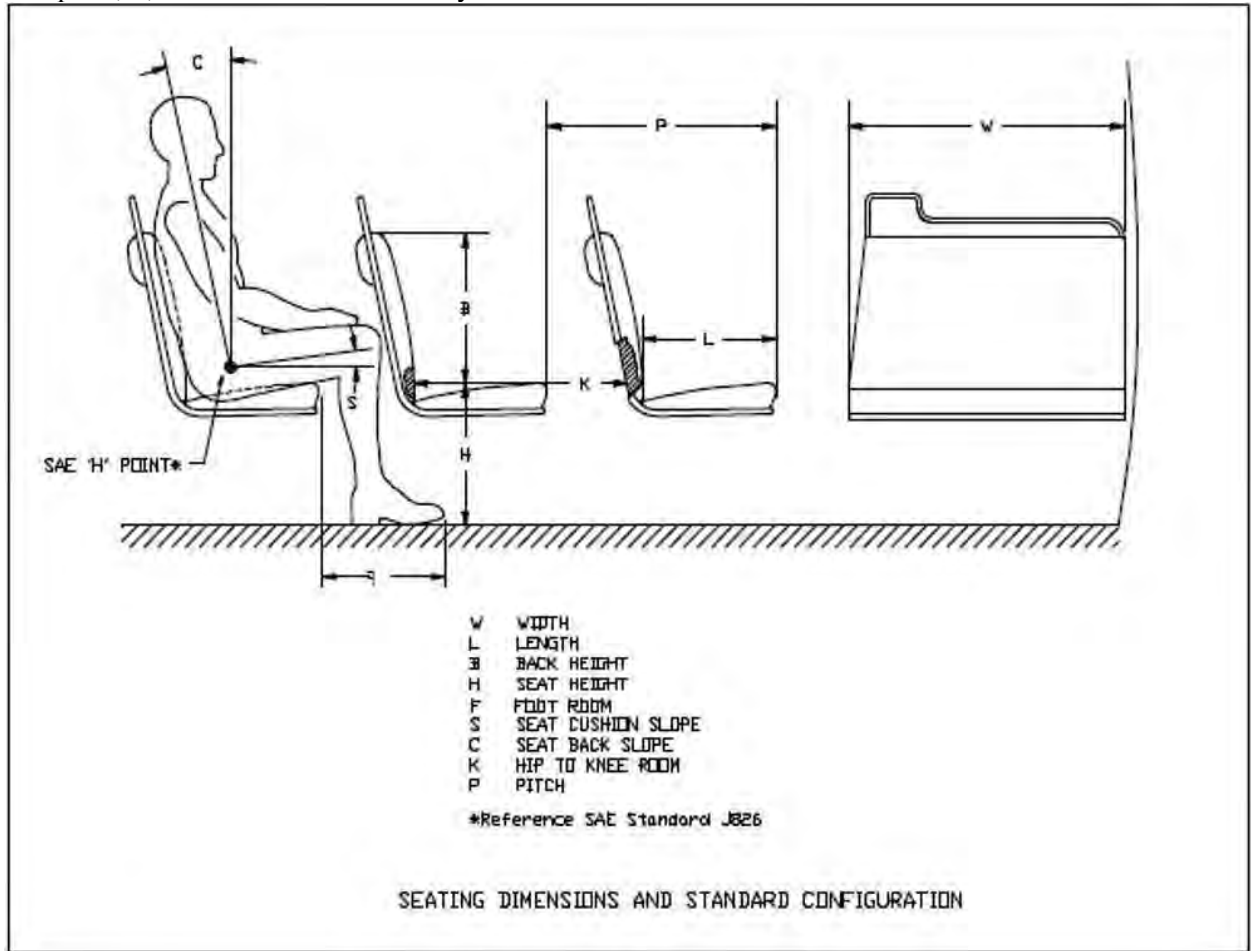
The aisle between the seats for a two (2) plus two (2) arrangement shall be no less than twenty-one and a half (21.5) inches wide at seated passenger hip height. Longitudinal seats shall be of the same general design as transverse seats and the area between the longitudinal seat backs and the attachment to the side, wall of the bus shall be designed to prevent debris accumulation.

DIMENSIONS

Seat dimensions for the various seating arrangements shall have the dimensions as follows (see diagram below):

- 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 the Agency.
- Foot room = F
- The seat cushion slope, S, shall be between 5 and 11 deg.
- The seat back slope, C, shall be between 8 and 17 deg.
- Hip to knee room = K
- The pitch, P, is shown as reference only



STRUCTURE AND DESIGN

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 1000lbs onto the femur of passengers ranging in size from a 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at 0.05 to 0.015 seconds from initiation.

Permanent deformation of the seat resulting from two 95th- percentile males striking the seat back during this 10g deceleration shall not exceed 2 in., measured at the aisle side of the seat frame at height H. The seat back should not deflect more than 14 in., measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.

The seat assembly shall withstand static vertical forces of 500 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 ¼in. 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 36in. 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 7⁄8 in. in diameter for standees and seat access/egress. The handhold shall not be a safety hazard during severe decelerations. The handhold shall extend above the seat back near the aisle so that standees shall have a convenient vertical assist, no less than 4 in. long that may be grasped with the full hand. This handhold shall not cause a standee using this assist to interfere with a seated 50th-percentile male passenger. The handhold shall also be usable by a 5th- percentile female, as well as by larger passengers, to assist with seat access/egress for either transverse seating position. The upper rear portion of the seat back and the seat back handhold immediately forward of transverse seats shall be padded and/or constructed of energy-absorbing materials. During a 10g deceleration of the bus, the HIC number (as defined by SAE Standard J211a) shall not exceed 400 for passengers ranging in size from a 5th percentile female through a 95th percentile male.

The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where a vertical assist is provided.

Longitudinal seats shall be the same general design as transverse seats but without seat back handholds. Longitudinal seats may be mounted on the wheelhouses. Armrests shall be included on the ends of each set of longitudinal seats except on the forward end of a seat set that is immediately to the rear of a transverse seat, the driver's barrier, or a modesty panel, when these fixtures perform the function of restraining passengers from sliding forward off the seat. Armrests are not required on longitudinal seats located in the wheelchair parking area that fold up when the armrest on the adjacent fixed longitudinal seat is within 3½ in. of the end of the seat cushion. Armrests shall be located from 7 to 9 in. above the seat cushion surface. The area between the armrest and the seat cushion shall be closed by a barrier or panel. The top and sides of the armrests shall have a minimum width of 1 in. and shall be free from sharp protrusions that form a safety hazard.

Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 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 125lbs with less than ¼in. permanent deformation and without visible deterioration.

CONSTRUCTION AND MATERIALS

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 ¼in. 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 61. Passenger Assists

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. All handholds and stanchions at the front doorway, around the farebox, and at interior steps for bi-level designs shall be powder-coated in a high-contrast yellow color.

The forward-most vertical stanchions on either side of the aisle immediately behind the driver's area shall be a stainless steel finish.

TS 61.1 Assists

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.

A minimum of twenty (20) hand grips shall be provided along the assists on the low floor portion of the vehicle.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Seat handholds may be of the same construction and finish as the seat frame. Door-mounted passenger assists shall be of anodized aluminum, stainless steel or powder-coated metal. Connecting tees and angles may be powder-coated metal castings. Assists shall withstand a force of 300 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 61.2 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.

TS 61.3 Vestibule

The aisle side of the driver's area, 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 area, wheel housings or front modesty panel.

TS 61.4 Rear Doorways

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.

Overhead assists shall simultaneously support 150 lbs. on any 12in. length. No more than 5 percent of the full grip feature shall be lost due to assist supports.

TS 61.5 Overhead

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.

TS 61.6 Longitudinal Seat Assists

Longitudinal seats shall have vertical assists located between every other designated seating position, except for seats that fold/flip up to accommodate wheelchair securement. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. Assists shall be staggered across the aisle from each other where practicable and shall be no more than 52 in. apart or functionally continuous for a 5th percentile female passenger.

TS 61.7 Wheel Housing Barriers/Assists

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 62. Passenger Doors

TS 62.1 Accessibility Requirements

Doorways will be provided in the locations and styles as follows. Passenger doors and doorways shall comply with ADA requirements.

TS 62.2 Front Door

Door shall be forward of the front wheels and under direct observation of the driver. The doors shall be electric Vapor doors (or approved equal). The doors shall include an electronic door control unit (DCU).

TS 62.3 Rear Door

Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back. The doors shall be electric Vapor doors (or approved equal). The doors shall include an electronic door control unit (DCU).

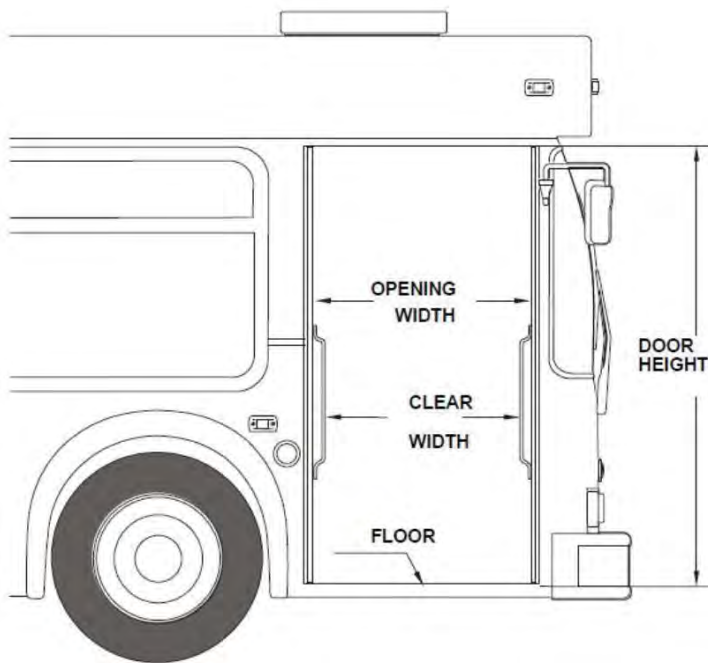
TS 62.4 Materials and Construction

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. Rear doors shall be equipped with sensitive age for safety.

The closing edge of each door panel shall have no less than 2 in. of soft weather stripping. The doors, when closed, shall be effectively sealed, and the hard surfaces of the doors shall be at least 4 in. apart (not applicable to single doors). The combined weather seal and window glazing elements of the front door shall not exceed 10 deg of binocular obstruction of the driver's view through the closed door.

TS 62.5 Dimensions

Transit Bus Minimum Door Opening



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 31¾ in. with the doors fully opened.

Rear door opening clear width shall be a minimum of 24 in. with the doors fully opened. If a rear door ramp or lift is provided, then the clear door opening width shall be a minimum of 31¾ in. with door fully opened.

If the Agency requires a minimum rear door clear width of 31¾ in. or greater and an outward opening (swing) door is specified, then the maximum outboard excursion of 13 in. may be exceeded.

TS 62.6 Door Glazing

The upper section of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section. The front door panel glazing material shall have a nominal ¼ in. thick laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673. Door glazing shall be easily replaceable.

TS 62.7 Door Projection

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.

Interior

Projection inside the bus shall not cause an obstruction of the rear door mirror or cause a hazard for standees.

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 8in. 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 62.8 Closing Force

Closing door edge speed shall not exceed 12 in. per second, and opening door speed shall not exceed 19 in. per second. Power doors shall not slam closed under any circumstance, even if the door is obstructed during the closing cycle. If a door is obstructed during the closing cycle, the pressure exerted on the obstruction shall not increase once initial contact has been made.

Doors closed by a return spring or counterweight-type device shall be equipped with an obstruction- sensing device that alerts the driver if an obstruction is detected between the closing doors, and will re-open the door to allow obstructions to be cleared. 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.

Rear Door Closing Force

Power-close rear doors shall be equipped with an obstruction-sensing system such that if an obstruction is within the path of the closing doors, the doors will stop and/or reverse direction prior to imparting a 10-lb force on 1 sq. in. of that obstruction. If a contactless obstruction sensing system is employed, it shall be capable of discriminating between the normal doorway environment and passengers or other obstructions within the doorway, and of altering the zones of detection based upon the operating state of the door system.

TS 62.9 Actuators

Doors shall open or close completely in not more than 3.5 seconds from the time of control actuation and shall be subject to the closing force requirements.

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing. The door actuators shall be rebuildable.

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.

TS 62.10 Emergency Operation

In the event of an emergency, it shall be possible to manually open doors designated as emergency exits from inside the bus using a force of no more than 25 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. Doors that are required to be classified as "emergency exits" shall meet the requirements of FMVSS 217.

TS 62.11 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. Location and operation of the switch shall require concurrence at the pre-production meeting.

TS 62.12 Five-Position Driver's Door Controller

The control device shall be protected from moisture. Mounting and location of the door control device handle shall be designed so that it is within comfortable, easy arm's reach of the seated driver. The door control device handle shall be free from interference by other equipment and have adequate clearance so as not to create a pinching hazard. The preferred control for DCTC is vapor digital controller.

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 62.13 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 63. Accessibility Provisions

Space and body structural provisions shall be provided at the front or rear door of the bus to accommodate a wheelchair loading system.

TS 63.1 Loading System

The wheelchair loading system shall be located at the front door, with the ramp being of a simple hinged, flip-out type design being capable of deploying to the ground at a maximum 6:1 slope. A Lift- U flip out (or approved equal) access ramp shall be installed.

The ramp system shall be compliant to requirements defined in 49 CFR Part 38, Subpart B, §38.23c shall provide ingress and egress quickly, safely, and comfortably, both forward and rearward directions, for a passenger in a wheelchair from a level street or curb.

When the system is not in use, the passageway shall appear normal. In the stored position of the ramp, no tripping hazards shall be presented and any resulting gaps shall be minimized. The controls shall be simple to operate with no complex phasing operations required, and the loading system operation shall be under the surveillance and complete control of the operator.

The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The wheelchair loading system shall not present a hazard, nor inconvenience any passenger. The loading system shall be inhibited from retracting or folding when a passenger is on the ramp/platform. A passenger departing or boarding via the ramp shall be able to easily obtain support by grasping the passenger assist located on the doors or other assists provided for this purpose. The platform shall be designed to protect the ramp from damage and persons on the sidewalk from injury during the extension/retraction or lowering/raising phases of operation. The loading platform shall be covered with a replaceable or renewable, nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading.

Deployment or storage of the ramp shall require no more than 15 seconds. The device shall function without failure or adjustment for 500 cycles or 5,000 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 device in the event of a primary power failure. The manual operation of the ramp shall not require more than 20 lbs. of force.

TS 63.2 Wheelchair Accommodations

Two forward-facing Q'Pods locations with integrated wheelchair barrier, 3 passenger flip-up seat, remote belt release, compact ratchet style handle with trigger release, & adjustable shoulder belt as close to the wheelchair loading system as practical, shall provide parking space and securement system compliant with ADA requirements for a passenger in a wheelchair.

TS 64. Signage and Communication

TS 64.1 Destination Signs

GENERAL SYSTEM REQUIREMENTS

An electronic all Silver LED destination sign system shall be supplied for the bus with destination signs for the front, side, and rear of the bus plus a route number sign on the dash. The electronic destination information system shall be ADA compliant. The LED's on all signs shall be amber or white.

A Twin Vision "Smart Series III", automatic electronic Passenger Information Display Sign System (or approved equal) shall be furnished and installed in the Bus. The System shall consist a minimum of:

- Front Sign: 16 rows x 160 columns Silver LED; display height minimum 7.9 inches, display width 63"
- Curb Sign: 14 rows x 112 columns Silver LED; display height minimum 4.2 inches, display width 42".
- Dash Sign: Dash Sign: 12 rows x 40 columns Silver LED; column addressable route sig
- Rear Sign: 16 rows x 48 columns White LED; display height minimum 6.1 inches, display width 17".
- Multi Control Unit (MCU) with integral USB port

CABLES AND ACCESSORIES

The Front Sign shall be mounted on the front of the Bus, near the top edge of the body, behind windshield protection, and in an enclosed but accessible compartment provided by the Bus manufacturer.

The Side Sign shall be located on the right side of the Bus near the front door either mounted near the top of an existing window or in a separate enclosed but accessible weather-proof compartment provided by the Bus manufacturer.

The Rear Sign (external) shall be mounted on TwinVision (or approved equal) supplied brackets on the rear of the vehicle on an appropriate sized cutout provided by the Bus Manufacturer.

The entire display area of all signs shall be readable in direct sunlight, at night, and in all lighting conditions between those two lighting extremes, with evenly distributed illumination appearance to the un-aided eye.

The system shall be microprocessor-based utilizing approved bi-directional serial communications such as SAE 1708 and shall utilize error detection techniques within the communication protocol. Communication within and between the sign elements shall be over an RS485 interface.

A Master Controller Board shall be mounted in the front sign. Independent Sign Driver Boards shall be mounted in the front & side destination sign. The Master Controller Board and the Sign Driver Boards shall be capable of accepting updated firmware levels via direct programming using a USB key and loaded through the USB port located on the OCU. Each sign circuit must be fused at the Master Control Panel with a visual indicator showing communication and power status. The Master Controller Board shall be capable of sending discrete outputs indicating system health to an onboard AVM system. The system shall be capable of communicating with additional information devices, such as interior information signs, Voice Annunciation devices, farebox, etc. The system shall provide for destination and/or Public Relations (P/R) message entry.

Flash memory integrated circuits shall be capable of storing and displaying up to 10,000 message lines. Message memory shall be changeable by the use of a "USB Key" sized according to the message listing noted herein. Download via a PCMCIA card or Memory Transfer Unit will not be accepted.

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.

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

An emergency message shall be activated by a push button or toggle switch (OEM provided) 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 entering a new destination code, or power cycling (after removal of the emergency signal). The status of the Emergency Message circuit shall be indicated by a light located on the front sign Master Control Panel.

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

Power to the Sign system shall be controlled by the Master Coach Run Switch. The signs shall operate in all positions of this switch except off. The signs shall internally be protected against voltage transients and RFI interference to ensure proper operation in the local environment.

DISPLAY AND DISPLAY ILLUMINATION

All sign displays shall consist of pixels utilizing High Intensity surface mounted Light Emitting Diodes ("LED"), for superior outdoor environmental performance, (of Amber illumination appearance of light wavelength of 590 NM). LED should be made of AlInGaP II (or approved equal) superior UV resistant Epoxy lens and superior resistance to the effects of moisture. Each pixel shall have a dedicated LED for illumination of that pixel in all lighting conditions. The sign system shall have multi-level intensity changes, which adjust automatically as a function of ambient lighting conditions. There shall be no requirement for any fan or any specialized cooling or air circulation.

This LED shall be mounted such as to be visible directly to the observer positioned in the viewing cone, allowing for full readability 65 degrees either side of the destination sign centerline. The 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. Each LED shall not consume more than 0.02 Watts.

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

SIGN ENCLOSURES

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

ELECTRONIC SYSTEM REQUIREMENTS

All electronic circuit boards used in the Sign System shall be conformal coated to meet the requirements of military specification MIL-I-46058C. All Sign System light board components shall be certified to have been subjected to a "burn-in" test of a minimum of twelve (12) hours operation in a temperature of 140 degrees F. prior to final inspection.

- **FRONT SIGN:** The Front Sign message shall be readable by a person with 20/20 vision from a distance not less than 350 feet for signs of display height greater than 8 inches and from a distance not less than 275 feet for display heights less than 8 inches. The Front Sign shall have a viewing cone of equal readability at 65 degrees on either side of a line perpendicular to the center of the mean plane of the display. The intensity of the illumination of the display pixels shall appear, to the naked eye, to be approximately uniform throughout the full viewing cone.
- **SIDE SIGN:** The Side Sign message shall be readable by a person with 20/20 vision, from a distance of not less than 110 feet. The Side Sign shall have a viewing cone of equal readability at 65 degrees on either side of a line perpendicular to the center of the mean plane of the display. The intensity of the illumination of the display pixels shall appear, to the naked eye, to be approximately uniform throughout the full viewing cone.
- **Dash Sign:** The Dash Sign message shall be readable by a person with 20/20 vision, from a distance of not less than 110 feet. The Dash Sign shall have a viewing cone of equal readability at 65 degrees on either

side of a line perpendicular to the center of the mean plane of the display. The intensity of the illumination of the display pixels shall appear, to the naked eye, to be approximately uniform throughout the full viewing cone.

- **REAR DESTINATION SIGN:** The Rear Sign shall be capable of independently displaying alpha-numeric characters. Its message shall be readable by a person with
- 20/20 vision, from a distance of not less than 225 feet. The Rear Sign shall have a viewing cone of equal readability at 65 degrees on either side of a line perpendicular to the center of the mean plane of the display. The intensity of the illumination of the display pixels shall appear, to the naked eye, to be approximately uniform throughout the full viewing cone.
- **OPERATOR CONTROL UNIT (OCU):** A MCU Unit (Multi Control Unit) shall be used to view and update display messages. It shall have an LCD screen with touch screen function buttons. It shall be capable of being recess mounted on the Bus vehicle front Sign compartment access cover or in the driver's dash area. The MCU shall utilize a multi-key conductive rubber pad keyboard and be designed for transit operating conditions and a maximum depth of 1.25".

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

The MCU shall also contain the capability to manually select the Block Number Sign information (from 1 to 4 Alpha-Numeric characters) to be sent to the Block Number sign, independent of any pre-programmed destination sign message information.

The MCU shall contain a USB port which will accept the destination data upload programmed by the software package below.

PROGRAMMING

A MS WINDOWS® (or approved equal) programming software package shall be supplied, under limited-use license, to generate message lists for the Sign system.

The programming software package shall use the capacity of an IBM 486 or higher PC/AT, having not less than 16 megabyte of RAM, to allow the USB to be programmed directly from the PC.

The program shall be designed for ease of deleting and adding messages to a destination Sign list.

The Programming Software shall be intuitive, of design to facilitate ease of training, and use context-sensitive help features. Reasonable on-site training support shall be provided with the software.

This software will provide capability for custom message writing by selection of preprogrammed standard variable width fonts. This allows for creation of a custom font by varying spacing between characters, words, or other message elements. This software also allows for creation of graphic displays with or without text; by selecting preprogrammed graphic Sign images and by allowing use of multiple fonts within the same message and graphic symbols placed anywhere within the display area.

MESSAGE MEMORY TRANSFER AND UPDATE

The Sign system shall be reprogrammable on the Bus vehicle with the use of a USB Key. A key slot shall be provided on the MCU face for this purpose. The maximum reprogramming time for a 10,000 line listing shall be 30 seconds. Additionally, Wireless Sign System Programming will be included – Wireless device connected to the MCU that allows connectivity to a facility based antenna through 802.11 Wi-Fi signals. Data shall be managed by a back office software program for fleet programming and updates.

MESSAGE LISTING

Upon receipt of the contract/purchase order the vehicle manufacturer shall supply to the Sign manufacturer, within 14 days, a list of the Message readings or listings such as to allow the Sign System to be preprogrammed with the correct readings.

CABLES

The bus harness shall be of a point-to-point configuration between destination signs and shall be of a highly visible yellow color to enable quick and positive identification.

WARRANTY

All Destination sign parts shall have a (12) year warranty on all parts.

PRICING FOR ADD-ON OPTIONS

The TwinVision Smart Series III (or approved equal) is to have a complement of add on upgrade options available below. Pricing is to be provided for the following add on options:

- INFOtransit Passenger Information System (or approved equal) – A system Controller and LCD Screens deliver live GPS location via visual route ladder. Video and still images for public service announcements and advertising. Allows for geo location targeted advertising and messaging to passengers inside the vehicle.
- Sign System Integrated Back up Camera – A color camera integrated into the rear sign housing of the TwinVision Smart Series III (or approved equal) sign system allows for a video image to be captured and displayed on the MCU (Multi Control Unit) LCD screen. This screen is located in the operator's cockpit area. The video image captured will display on the MCU's LCD screen once the vehicle is placed into reverse. The image will only display while the vehicle gear selector switch is in the reverse "R" position.
- Sign System Controller Paperless DOT Inspection – Programming in the MCU (Multi Control Unit) that allows for push button selection of daily routine DOT required inspection items. These items are typically inclusive of safety and vehicle functionality used to determine vehicle operational worthiness. The MCU will store data collected from multiple operators and will offload the data collected through a Wi-Fi 802.11 signal. This signal would connect to a facility based antenna. Data shall be managed by a back office software program.

TS 64.2 Covert Alarms

A networked Covert Emergency Alarm shall be provided along with the Twin Vision Destination Sign System (or approved equal) for the operators use in dangerous situations. The alarm shall be programmable and integrated with the Destination Sign System to display an emergency message on the bus exterior. It should also be capable of networking with an optional radio system to transmit audio from a listen-in microphone as well as location data from the AVL if installed. It should also capable of signaling the DVR system to tag and save recordings. Once activated the emergency shall be cancelled by entering a new destinations code or by repowering the Destination Sign System.

TS 64.3 Automated Voice Annunciation System (AVAS)

The DR700 (or approved equal) stop announcement system shall be capable of providing a single log-on for other in-vehicle electronics systems (e.g.; destination / head signs systems, fare collection systems, automatic passenger counters, etc.). The communications protocol to accomplish system integration shall be SAE J1587/J1939 or DRSIP. The system shall include an easy-to-use means of specifying whether log-on and/or passwords are required, and what vehicle operator ID's and passwords are acceptable for each sub-system.

The system shall allow the operator to select the route and shall display the route and the next stop to be announced on the operator control unit. The operator shall have the ability to scroll forward or backward within

the selected route's list of announcements. Internal announcements are intended for on-board riders and shall play either by manual activation by the operator or in response to signals received by an on-board Automatic Message Trigger (AMT). The Automatic Message Trigger function shall incorporate a Global Positioning System (GPS) receiver with WAAS and dead-reckoning augmentations. External announcements shall play automatically when the door is opened for a stop.

The system shall also provide the ability to define and play up to 99 special announcements and 200 announcements which play at pre-defined times of day, depending upon the amount of memory available. The system shall provide the ability to play external announcements on a repeating "loop" at regular time intervals until canceled by the operator.

The system shall provide an easy-to-use means of updating the programmed database in the in-vehicle stop announcement system's vehicle logic unit with a USB data key.

The DR700 (or approved equal) stop announcement system shall have dual channel audio capable of playing simultaneous internal and external announcements. Vendor shall provide all database programming and route mapping services necessary for the system to be fully functional.

The system shall include a noise-sensing function. An Automatic Volume Control (AVC) system with three sensing inputs shall automatically and independently adjust each channel's audio volume as appropriate in response to ambient noise detected.

TS 64.4 Vehicle Logic Unit (DR-700 Or Approved Equal)

The DR700 VLU (or approved equal) shall provide the hardware and software necessary to:

- Provide a single-point login for connected equipment
- Coordinate audio announcements and sign displays
- Accept data generated by the Route Mapping Module (RMM/DMM) and Central Recording Station (CRS) database software applications
- Off-load data and accept updates via USB data key and/or 802.11 WLAN
- Integrate with Digital Recorders' Type LT2, Type N, TCH, and Type Q Operator Control Units
- Integrate with internal LED signs for internal announcements
- Download and control data for TwinVision™ (or approved equal) SAE J1587 destination signs
- Control data for Luminator SAE J1587 destination signs
- Interface with J1587/J1939 controllers, and other onboard devices
- Allow for future hardware and software expansion
- Support Wireless Data Transfer for software, configuration, announcement data, and route data updates
- Supports all features and functions associated with the Digital Recorders' AVL2 (or approved equal) automated vehicle location system

At a minimum, the VLU shall have the following hardware and characteristics:

- Overall size: 8.50" long, 8.38" wide, and 3.87" high
- 4 audio outputs, 25W each (2 internal, 1 external, 1 driver monitor speaker)
- 1 driver microphone input
- 2 ambient sensing inputs
- 16 discrete inputs
- 3 discrete outputs
- 2 x SAE J1708
- 2 x SAE J1939 (CAN 250K)
- 5 x RS232

- 2 x RS485
- 4 x USB
- Integrated 20-channel GPS with dead-reckoning
- 4 x RJ45 Ethernet
- Integrated Wi-Fi capability supporting IEEE 802.11
- Positive-locking, heavy-duty connectors
- Hardware & software feature expansion
- Built-in real-time clock
- Compliance with DRSIP communications protocol

TS 64.5 Audio Diagnostics

The Stop Announcement vehicle logic unit shall be capable of playing audio diagnostics for all currently integrated electronics and capability for electronics which may be integrated in the future. This includes diagnostics for the destination sign system, internal passenger information signs, Operator Control Unit, internal speaker system, external speaker system, navigation system, and vehicle maintenance devices. The VLU shall confirm proper communications with each of these devices, log results, and provide audio messages describing any failures.

TS 64.6 Transit Control Head (TCH) (OCU)

Transit Control Head

The contractor shall provide the Clever Devices TCH (transit control head) (or approved equal) as the bus operator interface that interfaces with the DR700 VLU to provide the onboard functionality

- The TCH shall use a full color, touch screen, backlit display, readable by the vehicle operator from the seated position under the full range of ambient illumination conditions
- The TCH shall have operator-controlled brightness
- The TCH shall have an anti-glare coating and adjustable orientation mounting
- The TCH shall be operated using touch screen programmable buttons with visual and audible feedback provided by an embedded speaker
- The operator shall not be able to manually shut off or disconnect power to the TCH or access functionality to manually shut down the onboard system
- The TCH shall meet the following environmental conditions as defined by J1455:
 - Power Source 24Vdc
 - Operating temperature: -30°C to +60°C
 - Storage temperature: -40°C to +70°C
 - Humidity: 5% to 95%, non-condensing
 - Vibration: SAE J1455 4.9.4
 - Shock: SAE J1455 4.10.3
 - Dust and water intrusion Operator interface (TCH): NEMA4, IP65
 - ESD SAE J1112/13
- The TCH shall be mounted within comfortable reach by a full range of vehicle operators while in the seated position
- The TCH shall be securely mounted in the interior of the vehicle, so as to avoid blocking vehicle operator line of sight to the front and side windows

TS 64.7 Type-N Operator Control Unit (TCH)

The Type-N Operator Control Unit (TCH) (OCU), in conjunction with the VLU, shall provide a single operator log-on for electronic devices on the transit vehicles, at the Authority's discretion.

The MDT shall provide a display and keypad which are specifically adapted for transit operations. The Type-N shall have the functionality to control both the destination signs and the voice annunciation system.

The graphical display of the MDT shall allow for a variety of fonts with multiple lines of text and up to 40 characters per line. The MDT shall also contain an audio annunciator that beeps indicating that a key is depressed. A warning beep sounds to indicate incorrect key selection. The MDT keypad shall have 18 keys within a sealed, electrometric membrane and a rotary dial with a push to select function. The MDT enclosure shall be constructed using a rugged housing and meet FCC Part 15 for shielding of EMI/RFI.

It shall be possible to configure the MDT to work as an AVAS MDT only device, or to interwork with the DR AVL2 system (or approved equal).

TS 64.8 GPS-Based Automatic Message Trigger

The GPS-Based Automatic Message Trigger (AMT) shall automatically determine adherence to the bus route and trigger the announcement of the next bus stop as it is approached. The AMT shall utilize signals received from GPS satellites, WAAS satellites, a heading sensor, and an odometer sensor to provide continuous location information and automatic correction. This four-pronged approach maximizes accuracy of location information, even in the event of multi-path interference or signal drop-outs (i.e. in dense urban areas with tall buildings, etc.)

Once initialized, the automatic announcement system shall not require operator intervention or action in the event of off-route excursions. Short term GPS dropouts and/or signal errors shall not operationally degrade on-route system performance. The system shall detect off-route excursions and remain silent when off route. The system shall detect reacquisition of the route, at any point along the route, and automatically determine and announce the next valid bus stop. Off-route and on-route detection and recovery shall be automatic and not require operator intervention or action, nor shall it require the vehicle to be driven to special reacquisition points.

The GPS shall be capable of providing its positioning information to other onboard equipment. Continuous position, heading, and speed information shall be available via industry-standard interface and protocols should the transit system wish to utilize the data with other onboard electronics.

The GPS information shall be made available for use in AVM and AVL applications.

TS 64.9 Internal Display Sign

The internal display sign shall display coordinating text for next stop and other audio announcements. The sign shall meet all ADA requirements for internal signage. The sign shall be a Light Emitting Diode (LED) type sign with 16 characters per line with bright amber LEDs. Sign shall be no larger than 27" x 2 1/8" x 4 1/8" (single line) or 6 1/8" (double line). The sign shall be programmable via the DR700 CRS. Messages can be shown streaming or by any of 3 single frame modes with automatic centering. Speed, delays, and looping shall be programmable. Busy/ready status shall be poll-able. Forced reset capability shall exist.

The internal LED display sign shall be used to display the words "Stop Requested" and shall be visible to passengers. When the passenger chime is activated and shall remain on until the front or rear door is opened. The internal LED display sign shall also be used to display "Lift Requested" when the passenger chime is activated provided there are separate outputs on the vehicle to designate different chimes for Stop Requested and Lift Requested.

Enclosure shall be aluminum with welded and sanded seams, black powder paint finish and acrylic fascia with matte finish for reduction of reflected glare. Sign shall be constructed to withstand the harsh environmental conditions found in transit applications.

TS 64.10 Public Address Speakers

The VLU stop announcement system shall utilize 4-6 8 ohm speakers wired in parallel for internal announcements. Internal speakers shall have a range of 70 - 15,000 Hz at a minimum. The external speaker(s) shall be a weatherproof, horn-type constructed of a hard plastic or aluminum material and have a minimum range of 200 - 15,000 Hz.

All internal and external speaker locations shall require prior approval by the Authority. A three way toggle switch shall be located on the operator console to allow operator access to internal/external/both speaker operation of microphone use. When the operator presses the microphone's push-to-talk button, any VLU pre-recorded message shall be simultaneously muted.

TS 64.11 Hands Free Microphone

The hands-free microphone shall provide a hands-free public address capability to the vehicle operator. The hands-free microphone shall operate in conjunction with the Digital Recorders DR700 Talking Bus system (or approved equal) or with any standard PA amplifier. The unit shall be completely integrated into the vehicle décor making it practically invisible to the operator.

The Hands-Free Microphone shall not require operators to remove their hands from the steering wheel, lean over to adjust the microphone, or take their eyes off the road.

To make an announcement: the driver shall (at their convenience) simply depress a foot-pedal; speak in a normal tone of voice, and release to record a message. As the vehicle approaches the announcement point, the foot-pedal shall be pressed again to play back the announcement through the vehicle's speakers.

The Hands-Free Microphone shall override any Talking Bus (DR700) (or approved equal) announcement, keeping the operator in full control of the vehicle announcement system.

The Hands-Free Microphone shall be suitable for use in new and existing vehicles. The microphone unit shall be composed of a low profile vandal-proof enclosure with no exposed wiring or surface conduit. The unit shall be mounted to the steering column cover with no visible screws minimizing the threat of tampering.

TS 64.12 Wireless Data Transfer

The vehicles shall be equipped with Digital Recorders a DR700 with integrated Wi-Fi capability (or approved equal). The Wireless Data Transfer System shall include vehicle hardware, base station hardware, and software for wireless transfer of data between a centralized base station and individual fleet vehicles. With the exception of the antenna, the on-vehicle hardware shall be internal to the DR700 (or approved equal). Data shall be transmitted using an industry-standard 802.11 system with security enhancements.

Data network shall include WPA and WPA2 encryption and authentication. The wireless technology shall not require the transit authority to obtain a transmission license. The system shall communicate in both point-to-point and point-to-multipoint configurations.

The Wireless Data Transfer system shall be bi-directional and shall be used for the purposes of remote data collection from vehicle systems such as APC and AVM and/or for on-vehicle software and data updates.

The system shall permit date-specific deployment of changes and incremental updates (e.g., the system shall transmit only the voice announcements, destination sign text, route and schedule changes, etc. that have changed.) The wireless server software shall be configurable to determine frequency of data transmission and types of data transferred. The software shall make it possible to specify a future time and date for an update to become active.

The system shall allow automatic data transfer initiation (when the vehicle is in range of the base station) and requires no operator interaction.

Data collected from the vehicles shall be clearly labeled at the base station, and the software shall permit sorting/filtering/searching of parameters. Pre-configured, standard reporting options shall be available within the software package itself, and the data may be exported in industry standard delimited formats for external use and specific software applications.

TS 64.13 Interior Displays

Provisions shall be made on the rear of the operator's barrier for a frame to retain information that is posted by the Procuring Agency, such as routes and schedules that are sized approximately 21 inches wide and 22 inches high. Advertising media 11 inches high and 0.09 inches thick shall be retained near the juncture of the bus ceiling and sidewall. The retainers may be concave and shall support the media without adhesives. The media shall be illuminated by the interior fluorescent light system.

TS 65. Passenger Stop Request/Exit Signal

A passenger "Stop Requested" signal system that complies with applicable ADA requirements defined in 49 CFR, Part 38.37 shall be provided. The system shall consist of pull cords, signal switches, chime, and interior sign message. The pull cords shall be easily accessible to all passengers, whether seated, standing, at wheelchair parking positions or priority seating positions.

Exit signals located in the wheelchair parking area shall be no higher than 4 feet above the floor. Instructions shall be provided to clearly indicate function and operation of these signals.

A single "Stop Requested" chime shall sound when the system is first activated. A double chime shall sound when the system is first activated from wheelchair passenger areas. The operator shall be able to deactivate the signal system from the operator's area.

A networked and integrated, all LED, interior variable message sign shall be provided with the Voice announcement system. The internal display sign shall display coordinating text for next stop and other audio announcements. The sign shall meet all ADA requirements for internal signage. The sign shall be no larger than 27" x 2 1/8" x 4 1/8" (single line) and be programmable. To generate streaming messages with automatic centering, speed control, delays, and looping. The sign enclosure shall be aluminum with welded and sanded seams, black powder paint finish and red acrylic fascia with matte finish for reduction of reflected glare.

The internal LED display sign shall be used to display the words "Stop Requested" and shall be visible to the passengers. An indicator light at the instrument panel shall alert the driver of a stop request. This shall be illuminated when a stop request signal is activated and shall remain on until the front or rear door is opened.

TS 66. USB Charging

Passenger seating shall access to USB charging ports.

TS 67. Radio

The radio and antenna, if selected, will be provided by the Procuring Agency for installation by the Manufacturer. The Manufacturer shall designate and provide a location for the radio control head, speaker, handset, and cradle. The location shall conform to SAE Recommended Practice J287 "Driver Hand Control Reach." The Radio should be capable of being controlled by other network components such as the ability to broadcast an emergency signal when the on bus covert emergency panic button is activated by the driver.

Provisions for attaching a compatible radio antenna to the roof and routing an antenna lead to the radio compartment shall be provided. Antenna mounting shall conform to the electromagnetic suppression requirements of SAE J551. A roof mounted radio antenna requires a ground plane to prevent electronic noise being generated inside the vehicle. A metal roof can serve as a sufficient ground plane, however a fiberglass roof requires either a metallic surface, or an antenna with a virtual ground plane. To test and repair antenna connections, quick access shall be provided inside the vehicle at the point where the antenna is mounted to the roof and where the antenna

cable attaches to the antenna.

TS 68. Special Tools and Equipment (See Pricing Exhibit E)

In addition to any of those tools and equipment listed below which are applicable to the Contractors buses, the Contractor should identify all additional special tools and diagnostic equipment needed to properly maintain all standard and optional equipment to be provided on the buses. If more than one tool is required to work on a single bus, i.e. a jacking adaptor, the tools should be identified as a set with the number of tools identified, for example – Jacking Adaptor Set (2 each).

Any Diagnostic Equipment listed should be quoted as complete sets including all hardware, software, cabling, connectors and batteries needed to complete work on the buses. However, if a unit of hardware has diagnostic application to multiple systems, it should be listed separately from the related software and connecting hardware for each component or system. Likewise if the software or diagnostic hardware (breakout boxes) can be used with a commercially available device such as a Laptop computer or PDA, then these hardware devices should only be identified and noted as required for use, and not be included here as separate price quotes.

1. Portable hand held readers for troubleshooting of the multiplexing system
2. Towing adapters
3. Jacking adapters
4. Special tools for Electric bus maintenance kit (contractor to identify contents)
6. Break out boxes for electrical components (contractor to identify contents)
7. Handheld diagnostic readers w/ printers for electric charging and drive system
10. Wheel alignment tools
11. Cartridge and diagnostic reader for ABS/ATC
12. Programming device (USB) for the destination sign system
13. On-board digital recording system programming and diagnostic hardware and software
14. Diagnostic software CD's and license if required for all vehicle systems that require such software, cabling for software is to be priced separately.
16. Programming key, cables and any items needed for diagnostics or programming of Multiplex system

TS 69. Spare Parts (See Pricing in Attachment F)

The following list of spare parts shall be provided by the Manufacturer for purchase in individual or multiple orders. In providing quotes for these parts the Manufacturer should indicate the buses on which they are used and what additional components, if any, would also be included in that quote. OEM part numbers shall be included with the Bid.

- Traction Motor
- Extended Warranty
- Front Bumper
- Rear Bumper
- A/C Compressor
- A/C Condenser Motor
- Fan Motor
- Rear Axle
- Wheelchair Ramp Assembly
- Set (Left and Right) Exterior Mirrors
- Alternator

- Evaporator Fan Motor
- Hydraulic Pump
- Multiplex modules (list each individually)
- Front Brake Kits (including Rotor, Pads, Caliper, and hardware)
- Rear Brake Kits (including Rotor, Pads, Caliper, and hardware)
- Passenger seat inserts
- Driver's seat rebuild kits (should include cushions and covers)
- Passenger Window Glass
- Passenger Window Assembly
- Windshield(s)
- Door Operator
- All lubricating, hydraulic, HVAC and air filters, listed separately with OEM part numbers
- Driver's Seat Assembly

TS 70 Optional Equipment (See Pricing in Exhibit D)

Optional equipment or services listed in this section would be provided to the Procuring Agency in addition to the equipment specified in the Baseline Bus. These items would require a separate bid price (per unit) by the Manufacturer. Selection of such an optional piece of equipment by the Procuring Agency would mean an addition or net deletion, by that amount, to the total unit price for each bus. It is possible that some of the equipment or services specified may be purchased in multiple quantities.

TS 70.1 Automated Fare Collection

A GFI Fast Fare Revolutionary Farebox (or approved equal) shall be provided and installed on each bus by the Manufacturer. This shall include a 15-amp minimum; DC, protected power circuit and a grounded lead with both wires enclosed in a flexible conduit. The farebox shall be fully integrated and networked and capable of sharing information with other networked devices such as the GPS system.

The farebox shall be used to collect and retain fares using a wide variety of fare media. The farebox shall be controlled by electronic logic and supported by electronic memory, displays and indicators. It shall permit the easy insertion of fare media by boarding passengers, provide a display for passenger information and have a generally pleasant and uncluttered appearance using human factors engineering practices and industrial design.

The farebox shall be reliable in revenue service operations, accurate in its counting and data reporting, secure in its retaining and transfer of data and collected revenue. Processing of cash and non-cash fares shall be fully automatic, not requiring the driver to view any portion of the passenger's fare deposit.

The farebox shall function under the environmental and operational conditions stated herein and shall be designed and manufactured to provide a high degree of security against forced entry and/or unauthorized manipulation.

The farebox shall provide specific information regarding daily operation, including revenue collected, types and quantities of fares collected, driver/route identification, and other information needed to account for revenue and monitor the equipment.

The farebox shall have the following operational features:

- Accept, validate, count, and register fares in the form of U.S. coins, tokens, and paper currency
- Return those coins and bills which are not valid or acceptable to the system
- Accept, validate and, if necessary, re-encode suitably encoded magnetic thin card fare documents
- Print, encode and issue a paper based, machine readable transfer from an internal supply of blank and un-encoded magnetic striped paper transfers

- Provide change in the form of encoded magnetic thin card for fare overpayment
- Permit the selected recharge of a stored value fare card
- Permit the recording of various types of fare transactions using driver-activated pushbuttons
- Accept smart cards
- Accept mobile ticketing

TS 70.2 Automatic Passenger Counter (APC)

Manufacturer will provide and install an Urban Transportation Associates, Smart Door, and automated passenger counting system (or approved equal). This system will include infrared sensors and all related hardware and software to count boarding and alighting passengers with an accuracy of 95% to 99%. The system shall work in conjunction with the Vehicle Logic Unit to be provided in the buses with the specified Clever Device/Digital Recorders Inc. automated voice recording system, to store and report data on passenger counts.

The APC system should work with the Vehicle Logic Unit and its corresponding Global Positioning Satellite receiver to download data reports on passenger counts, including date, time and location stamped records, through a portable medium such as a diskette or a USB storage device, or through a direct data transfer medium such as a direct cable connection or wireless LAN if such an option is also selected for those buses.

In addition to boarding and alighting count in the passenger doors the APC shall be capable of determining and reporting on count of the use of the wheelchair ramp and the bicycle rack if that option is selected.

TS 70.3 Automatic Vehicle Monitoring (AVM) Module

To enhance the capability of the specified automated voice annunciation system an Automatic Vehicle Monitoring (AVM) Module including vehicle hardware and software for data collection from on-board vehicle electronics shall be provided. The AVM hardware will include a USB storage device for storing collected data and all necessary interface logic and cabling for acquiring data from vehicle electronics (such as multiplex, propulsion, destination sign, and other systems). All data collected shall be GPS time and location stamped.

The AVM Module shall also include a state of the arts personal computer and software for reviewing collected data and generating management reports.

TS 70.4 Digital Video Recording System

The vehicle manufacturer shall supply all equipment, materials, labor, and installation for a complete Apollo 10 camera (HD) digital video recording system (DVR) (or approved equal) on each bus. The vehicle manufacturer shall provide all shop drawings, necessary permits, and operation and maintenance manuals. The DVR system must be a mobile-based digital video recording system that supports up to ten color cameras and stores digital images on a compact vehicle-mounted digital video recorder. The system components shall be located in a secure location approved by the Procuring Agency.

An adequate number of decals/signs notifying passengers of surveillance cameras on-board shall be installed in plain view throughout the bus. DCTC currently uses Apollo Video Technologies camera systems. DCTC'S CAD/AVL vendor interfaces with Apollo camera systems, and it is DCTC'S preference that this be arranged when pricing camera and CAD/AVL equipment.

Minimum of one (1) docking stations shall be included.

Wireless Download of Video:

Optional pricing will be provided for equipment required to enable wireless download of tagged or queried video events and diagnostic reports via a wireless LAN.

TS 70.5 Pedestrian Turn Warning System

Audible warning system that shall alert pedestrians of the turning bus when the turning angle of the bus exceeds a threshold recommended by the manufacturer. Sound levels shall be automatically adjusted for time of day and ambient noise conditions.

TS 70.6 Optional Radio

Pricing shall be provided for a Motorola APX6500 7/800 radio system, including:

1. Motorola APX6500 7/800 Radio
2. Cradle Style Hand Set
3. Auxiliary Speaker (7.5 watt)
4. Dash Mount Bracket
5. 3 Decibel Low Profile Antennae
6. Advanced System Key-Hardware Key
7. 3000 or 9600 Trunking Baud Single System
8. APX 05 Control Head and Software
9. Four Year Service from the Start Warranty

TS 70.7 Central Recording Station

The Central Recording Station (CRS) shall provide an easy-to-use means to record, edit and assemble announcement audio and to define route-stop structures, all within a single database. The CRS shall at a minimum allow the operator to specify the Operator Control Unit (OCU) or Mobile Data Terminal (MDT) announcement text, internal ADA compliant sign text, destination sign (external sign) to be displayed, internal announcements and external announcements.

All aural announcements shall be assembled from a list of audio files to reduce the size of the audio data storage. This interface shall allow the operator to easily change the order of the assembled audio recordings. The CRS shall at a minimum allow the operator to define Safety Messages that the vehicle operator may select to play at any time. The CRS shall allow the operator to define "Timed Messages" that may be played based upon: time of day, trip the vehicle is performing, day(s) of the week, a stop announcement, and combinations of these criteria.

The CRS shall be able to associate aural announcements, internal sign text, external announcements and external sign control to a combination of GPS location and direction of travel. Further, it shall allow the operator to define reduced external audio levels, including silencing, for announcements based upon time of day.

The CRS shall organize the stops in a tree structure where the stops are at the sub-levels under each Pattern. The CRS shall allow the operator to 'cut', 'copy', and 'paste' stops and their attributes between Patterns and to completely duplicate Patterns within the Tree display, using the familiar Microsoft Windows Explorer paradigm. This shall include at a minimum the ability to Paste New (create a fully independent copy that may be edited without affection the original announcements) and a Paste Copy that retains the connections to the original stop and pattern text and announcements. The CRS shall allow the operator to re-use stops without additional editing. Once defined a stop, its announcements shall be capable of being reused by all routes and patterns that service that stop without the necessity to recreate them.

The system shall include a PC workstation configured with all software and hardware required to easily program the system database onto USB keys and other memory storage devices. CRS software shall conform to the MS-Windows conventions for pull-down menus and mouse interface. In order to ensure the maximum flexibility of use, including easy and cost-effective integration of commercially available music and sound effects into public service announcements, the CRS shall capture all audio data in an industry standard format and no vendor-proprietary hardware may be used.

The vendor shall provide manuals and training materials of professionally produced quality. The vendor shall

provide training in the use of the CRS and shall provide telephone and fax support for CRS users.

TS 70.8 Route Mapping Services

Route Mapping Services shall include collection of GPS trigger points for each stop announcement and of same. Route Mapping requires the assistance of a bus operator or supervisor knowledgeable of all routes. This individual will drive the mapping vehicle and must be able to approve stop announcement locations. The number of routes and stops to be mapped shall be provided by the transit customer.

TS 70.9 Route Mapping Module

The Route Mapping Module shall include a mobile route mapping kit and software that enables the user to create and edit GPS geo-codes for the purposes of automatic voice announcements.

The mobile route mapping kit shall consist of GPS, GPS antenna, laptop computer maps, Digital Recorders mapping software, and DR700 to be used in a vehicle to map routes and announced stops and then verification of same.

TS 70.10 Attachments for Technical Provisions

PROCURING AGENCY SPECIFICATIONS- The following is a list of those subsections of the Technical Specifications, which call for additional details following the issuing of a purchase order. Details of Finish and Color for Exterior Paint/Decals, stripping, window tinting and logos. (7.57.1)

2. Details of Passenger Seating Materials including color of the seat material and material (vinyl/fabric) and color/pattern for padded seat inserts (7.60.2)

3. Details for Destination Sign Listings - within 30 days of the issuing of a contractor purchase order, the Procuring Agency will provided to the vehicle manufacturer the passenger information sign message readings and listing to be forwarded to the sign manufacturer to allow the Sign System to be preprogrammed with the correct readings. (7.64)

4. Details for Automated Voice annunciation system Listings - the Procuring Agency will make arrangements through the vehicle manufacturer to the subsystem supplier to have a Route Mapping Survey conducted including the collection of GPS trigger points for each stop announcement and verification of same, to allow programming of the voice annunciation system. (7.64.3)

TS 70.11 State Treasurer's lists regarding Iran and Boycott of Israel

If the value of the contract is \$1,000 or more, the following applies unless the candidate otherwise states in its proposal: the candidate affirms (by submitting a proposal) that (1) its name does not appear on the list of companies that are engaged in a boycott of Israel developed by the N. C. State Treasurer under N.C.G.S. 147-86.81(a)(1) or on a list created by the Treasurer pursuant to N.C.G.S. 147-86.58 as a company engaging in investment activities in Iran, and (2) it has no reason to expect that its name will appear on either of those lists. Take notice that a contract between a company named on either list and the City may be void.

320. Notice under the Americans with Disabilities Act. A person with a disability may receive an auxiliary aid or service to effectively participate in city government activities by contacting the ADA Coordinator, voice (919) 560-4197, fax 560-4196, TTY (919) 560-1200, or ADA@durhamnc.gov, as soon as possible but no later than 48 hours before the event or deadline date.

Aviso bajo el Acto de Americanos Discapacitados – Una persona con una discapacidad puede recibir asistencia o servicio auxiliar para participar efectivamente en actividades del gobierno de la ciudad con ponerse en contacto con el Coordinador de ADA, buzón de voz (919) 560-4197, fax (919) 560-4196, TTY (919) 560-1200, o ADA@durhamnc.gov, lo más antes posible pero no menos de 48 horas antes del evento o fecha indicada.

TS 70.12 Values of City of Durham regarding Treatment of Employees of Contractors

A. Statement of City EEO Policy. The City of Durham opposes discrimination in employment because of race, color, religion, sex, national origin, political affiliation or belief, age, or handicap. Therefore, it desires that firms doing business with the City:

1. not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, political affiliation or belief, age, or handicap.
2. take affirmative action to insure that applicants are employed and that employees are treated equally during employment, without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or handicap. This action includes employment, upgrading, demotion, transfer, recruitment or advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.
3. state, in solicitations or advertisement for employees, that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, political affiliation or belief, age, or handicap.
- 4- include this Statement of City EEO Policy in every purchase order for goods to be used in performing City contracts and in every subcontract related to City contracts.

B. Livable Wage. The City of Durham desires that firms doing business with the City pay their workers a livable wage rate while working on City contracts. The livable wage rate is \$14.15 per hour through June 30, 2018, and \$15.00 per hour for July 1, 2018 – June 30, 2019. The City will re-set the rate for the period after June 30, 2019.

**Others as required based on Options selected.*

SECTION 9: ATTACHMENTS, CERTIFICATIONS, AND ASSURANCES

Attachment A – Bid Submission Checklist

Bidder Name: _____

Attachment No.	Attachment Name	Check
Attachment A.	Bid Submission Checklist	
Attachment B.	Instructions for Bidder Cover Letter	
Attachment C.	Base Bus Pricing Proposal	
Attachment D.	Pricing Schedule for Optional Equipment and Services	
Attachment E.	Pricing Schedule for Optional Special Tools	
Attachment F.	Pricing Schedule for Optional Spare Parts	
Attachment G.	Bidder's Vehicle Technical Information	
Attachment H.	Comprehensive Quality Assurance Program Plan	
Attachment I.	Comprehensive Warranty Program Plan	
Attachment J.	Comprehensive Spare Parts Program Plan	
Attachment K.	Comprehensive Bas Bus and Optional Training Program Plan	
Attachment L.	Financial Capability	
Attachment M.	Bidder's References Form	
Attachment N.	Request for Clarification (RFC)	
Attachment O.	Request for Approved Equals (RAE)	
Attachment P.	Request for Deviation (RFD)	
Attachment Q.	Acknowledgment of Addenda	
Attachment R.	Bidder Questionnaire (Service, Parts & Distribution)	
Attachment S.	Cost Analysis Information	
Attachment T.	Federal Certification Regarding Lobbying	
Attachment U.	Federal Transit Vehicle Manufacturer's (TVM) Certification	
Attachment V.	Federal Certification of Compliance or Non-Compliance with Buy	
Attachment W.	Pre-Award Certification of Compliance With FMVSS Rolling Stock	
Attachment X.	Federal Certification Regarding Debarment and Suspension	
Attachment Y.	Federal Certification of Compliance with Bus Testing Requirement	
Attachment Z.	Federal Requirements and Special Conditions for Rolling Stock	
Attachment AA.	Signature Page of Agreeing to All Federal Requirements	
Attachment AB.	Offer and Award	
Attachment AC	City of Durham-Equal Business Opportunity Program Form	

Attachment B – Bidder Cover Letter

Bidder: _____

The Cover Letter must be on the Bidder's official letterhead signed by a person having the authority to commit offeror to a contract with the date of the Offer. The Bidder must provide a Cover Letter per Section 2.4.1, Bid Requirements, which includes at a minimum:

- Bidder's understanding of the products and services solicited via this IFB and an explanation of the Bidder's ability to perform the services described in its Bid.
- An affirmative statement that Bidder is willing to provide the products and perform those services described in its Bid and all attachments thereto according to the Delivery Schedule in Section 2.
- Commitment to enter into a mutual Contract with the Procuring Agency based on the terms and conditions set forth in this solicitation package.
- Description of key members of manufacturing team, including sub-contractors for bus and parts.
- Identify subcontractors in reasonable proximity of the Durham/Chapel Hill, NC area for Warranty, Quality Control, and Spare Parts issues.
- Bidder's understanding and willingness to provide product and services solicited via this IFB, Bidder's detailed approach and the quality and comprehensiveness of IFB as described in the Bidder's bid. The cover letter must state that the Bid will be good for 90 days after award.
- References to the Comprehensive Quality Assurance Program Plan, Comprehensive Warranty Program Plan, and Comprehensive Spare Parts Program Plan, and Comprehensive Training Program Plan.

Attachment C – Base Bus Pricing Proposal

Bidder: _____

On this form, the Bidder should include only the cost of the base bus as specified in the IFB. All optional or otherwise uniquely identified costs should be kept separate and only included in Attachment D, Pricing Schedule for Optional Equipment and Services, Attachment E, Pricing Schedule for Optional Special Tools, and Attachment F, Pricing Schedule for Optional Spare Parts. All prices are to be in United States dollars. The base bus price should include basic Warranty as specified in Section 5 and base bus Training as specified in Section 6 of this IFB. For the purposes of the Bids, pricing shall not include sales tax.

Cost Item	Unit Price
Cost for One 40' Battery Electric Powered Bus	\$
Delivery charges per Bus	\$
Charge Station	\$
Spare Parts	\$
Spare Tire and wheel	\$
TOTAL BID PRICE PER BUS	\$

Attachment D – Pricing Schedule for Optional Equipment and Services

Bidder: _____

For all options and pricing listed, the vendor must provide original and optional OEM part number and/or specifications per Section 2.2.3. and Section 7. Part numbers or specifications must be attached to this form and match the item numbers.

ITEM	EQUIPMENT AND SERVICES DESCRIPTION	UNIT PRICE
1.	BRT Style Package (Section 7.69.6)	\$
2.	Additional Training Cost Per Day	\$
3.	Additional Paint Passes (per bus), Beyond Base Amount (2)	\$
4.	Altro Flooring Heating Welding Kit (Part #ASTHWKT) or approved equal (Section 7.69.1)	\$
5.	Flush Glass-Bonded Passenger Side and Driver's Side Windows (Section 7.69.2)	\$
6.	Adjustable Brake Pedal (Section 7.69.4)	\$
7.	GFI Fast Fare Revolutionary Farebox (Section 7.69.7)	\$
8.	GFI Odyssey Farebox (Section 7.69.7)	\$
9.	Automatic Passenger Counter (APC) (Section 7.69.8)	\$
10.	Automatic Vehicle Monitoring (AVM) Module (Section 7.69.9)	\$
11.	Pedestrian Turn Warning System (Section 7.69.12)	\$
12.	Training - 1 Week of Operations Train the Trainer	\$
13.	Training – 1 Week Maintenance	\$
14.	Route Mapping Services	\$
15.	Auxiliary Heater	\$
16.	Over the Road Coach Style High-Back, Padded Seats with Stain-Resistant Upholstery (Section 7.69.3)	\$
17.	Motorola APX4500 7/800 Radio System (Section 7.69.13)	\$
18.	Route Mapping Module	\$
19.	Central Recording Station	\$
20.	Apollo Nine (9) Camera System (Section 7.69.10-11)	\$
21.	Apollo DVR Review Station (Section 7.69.10-11)	\$

Attachment D – Pricing Schedule for Optional Equipment and Services

Bidder: _____

ITEM	EQUIPMENT AND SERVICES DESCRIPTION	UNIT PRICE
22.	Apollo DVR Review Station (Section 7.69.10-11)	\$
23.	Apollo Wireless LAN to Download Video (Section 7.69.10-11)	\$
27.	Training - Bus Maintenance (Section 6.3.1)	\$
28.	Training - Bus Electrical (Section 6.3.2)	\$
29.	Training - AC/Heat System (Section 6.3.3)	\$
30.	Training – Propulsion System (Section 6.3.4)	\$
31.	Training - Transmission (Section 6.3.5)	\$
32.	Training - Transmission Overhaul (Section 6.3.6)	\$
33.	Training - Fire Suppression (Section 6.3.7)	\$
34.	Training - Wheelchair Ramp (Section 6.3.8)	\$
35.	Training - Parts and Support Familiarization (Section 6.3.9)	\$
36.	Training - Fare Collection Device (Section 6.3.10)	\$
37.	Training- Destination Sign System (6.3.11.1)	\$
38.	Training- Destination Sign System Programming (6.3.11.2)	\$
39.	Training- Computer Aided Dispatch/Automatic Vehicle Location (6.3.11.3)	\$
40.	Training- Automated Voice Announcement (6.3.11.4)	\$
41.	Training- Automated Passenger Counting (6.3.11.5)	\$
42.	Training- On-Board Surveillance System (6.3.11.6)	\$
43.	Delivery within 540 days / 15 months from date of Purchase Order (2.3.4)	\$
44.	Charging Station	\$

Attachment E – Pricing Schedule for Optional Special Tools

Bidder: _____

For all options and pricing listed, the vendor must provide original and optional OEM part number and/or specifications per Section 2.2.3. and Section 7. Part numbers or specifications must be attached to this form and match the item numbers.

ITEM	EQUIPMENT AND SERVICES DESCRIPTION	UNIT PRICE
1.	Portable Hand Held Readers for Troubleshooting the Multiplexing System	\$
2.	Towing Adapters	\$
3.	Jacking Adapters	\$
4.	Traction motor Dolly	\$
8.	Break Out Boxes for Battery Electric Drive system(if applicable)	\$
10.	Wheel Alignment Tools	\$
11.	Cartridge and Diagnostic Reader for ABS/ATC	\$
12.	Programming Device (USB) for the Destination Sign System	\$
13.	On-Board Digital Recording System Programming and Diagnostic Hardware and Software	\$
14.	Diagnostic software CDs and licenses if required for all vehicle systems that require such software, cabling for software is to be priced separately.	\$
16.	Programming key, cables and any items needed for diagnostics or programming of Multiplex system	\$

Attachment F – Pricing Schedule for Optional Spare Parts

Bidder: _____

For all options and pricing listed, the vendor must provide original and optional OEM part number and/or specifications per Section 2.2.3. and Section 7. Part numbers or specifications must be attached to this form and match the item numbers.

ITEM	EQUIPMENT AND SERVICES DESCRIPTION	UNIT PRICE
1.	Traction Motor	\$
2.	ESS	\$
3.	Complete Power Plant Assembly (Vendor to specify contents); As Applicable	\$
4.	Electric Radiator Fan Motor	\$
5.	Front Bumper	\$
6.	Rear Bumper	\$
7.	A/C Compressor	\$
8.	A/C Condenser Motor	\$
9.	Evaporator Fan Motor	\$
10.	Alternator	\$
11.	Wheelchair Tie-Down Assembly (all hardware and belts)	\$
12.	Wheelchair Ramp Assembly	\$
13.	Set (Left and Right) Exterior Mirrors	\$
14.	Rear Axle Hub	\$
15.	Differential Carrier Assembly	\$
16.	Radiator Assembly w/CAC	\$
17.	Hydraulic Pump	\$
18.	Electric Cooling Fan Motor	\$
20.	ABS Electronic Control Unit	\$
20.	Central Controller for Multiplex System	\$
21.	Multiplex Node (if applicable)	\$
22.	Driver seat Assembly	\$

Attachment F – Pricing Schedule for Optional Spare Parts

Bidder: _____

ITEM	EQUIPMENT AND SERVICES DESCRIPTION	UNIT PRICE
23.	ESS 12 year replacement warranty (define coverage terms)	\$
24.	Traction Motor Extended warranty (define coverage terms)	\$
25.	HVAC Extended warranty (define coverage terms)	\$
26.	Multiplex modules (list each individually)	\$
27.	Front Brake Kits (include drum or rotor, shoe / pad, lining and hardware)	\$
28.	Rear Brake Kits (include drum or rotor, shoe / pad and lining and hardware)	\$
29.	Driver's seat rebuild kits (should include cushions and covers)	\$
30.	Passenger Window Glass	\$
31.	Passenger Window assembly	\$
32.	Windshield(s)	\$
33.	Door operator	\$
34.	All lubricating, hydraulic, HVAC and air filters, listed separately with OEM part numbers	\$

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

The Bidder shall submit with their bid(s) for review by the Procuring Agency the following Vehicle Technical Information Data Sheets to confirm their proposed vehicle and components are in compliance with the requirements of the Technical Specifications. Submission of this data should not preclude the Bidder from including additional or supplemental Technical Information, descriptive literature, or equipment brochures in their own format, which further describes their bus.

TECHNICAL INFORMATION FOR 40' LOW FLOOR ELECTRIC BUS

A. BUS MANUFACTURER

1. Manufacturer _____

2. Bus Model _____

B. UNDERSTRUCTURE MANUFACTURER:

1. Manufacturer _____

2. Model Number _____

C. BASIC BODY CONSTRUCTION

1. Type _____

2. Tubing or Frame Member Thickness and Dimensions

a. Overstructure: _____

b. Understructure: _____

3. Skin Thickness and Material

a. Roof _____

b. Sidewall _____

c. Skirt Panel _____

d. Front End _____

e. Rear End _____

4. Flooring

a. Material _____

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

b. Thickness _____
c. Manufacturer _____

5. ESS

a. Capacity _____
b. Material _____
c. Warranty _____
d. Manufacturer _____

D. DIMENSIONS

1. Overall Length

a. Over Bumpers _____
b. Over Body _____Ft. _____In.
_____Ft. _____In.

2. Overall Width

a. Over Body (excluding mirrors) _____In.
b. Over Body (including mirrors) _____In.

3. Overall Height

a. Overall Height (maximum) _____In.
b. Overall Height (main roof line) _____In.
_____In.

4. Angle of Approach _____Deg.

5. Breakover Angle _____Deg.

6. Angle of Departure _____Deg.

7. Doorway Dimensions

	<u>Front</u>	<u>Rear</u>
a. Clear Door Width	_____In.	_____In.
b. Doorway Height	_____In.	_____In.
c. Knuckle Clearance	_____In.	_____In.

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

	<u>Front Step</u>	<u>Rear Step</u>
a. Kneeled	_____In.	_____In.

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

b. Unkneeled _____ In. _____ In.

9. Interior Head Room (center of aisle)

a. Front Axle Location _____ In.

b. Drive Axle Location _____ In.

10. Aisle Width Between Transverse Seats (min.)

a. Lower Floor _____ In.

b. Upper Floor _____ In.

11. Floor Height Above Ground (centerline of bus)

a. At Front Door _____ In.

b. At Rear Door _____ In.

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

a. Excluding Axles _____ In.

b. Including Axles _____ In.

13. Horizontal Turning Envelope (see diagram below)

a. Outside Body Turning Radius, TR0 (including bumper) _____ Ft. _____ In.

b. Front Inner Corner Radius, TRI _____ Ft. _____ In.

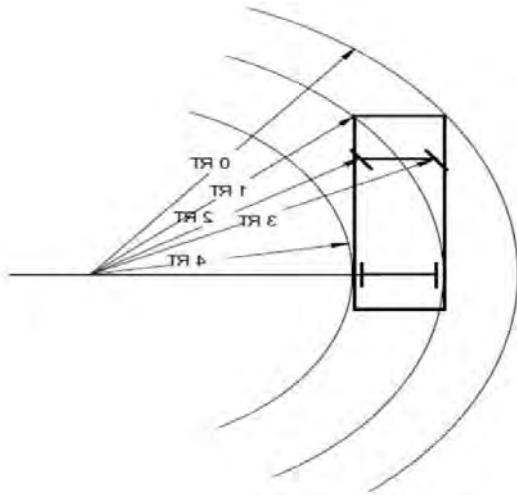
c. Front Wheel Inner Turning Radius, TR2 _____ Ft. _____ In.

d. Front Wheel Outer Turning Radius, TR3 _____ Ft. _____ In.

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

Attachment G – Bidder Vehicle Technical Information

Bidder: _____



14. Wheelbase (see x.x) _____ In.

15. Passenger Capacity Provided (see x.x)

a. Total Maximum Seating _____

E. WEIGHT OF BUS

	No. of People	Front Axle			Rear Axle			TOTAL BUS
		Left	Right	Total	Left	Right	Total	
Empty Bus Full Fuel & Farebox	0							
Fully Loaded (Standees)								
Fully Loaded (Seated) + Driver and Full Fuel								
Fully Loaded Total								

GVWR								
GAWR								

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

F. Propulsion System Electric

1. Manufacturer _____
2. Type _____
3. Model Number _____
4. Propulsion Control System _____
5. Net S.A.E Horsepower _____HP at _____RPM
6. Net S.A.E Torque _____lb. ft. at _____RPM

G. VOLTAGE REGULATOR

1. Manufacturer _____
2. Model _____

H. VOLTAGE EQUALIZER

1. Manufacturer _____
2. Model _____

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

I. ALTERNATOR

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

J. ESS

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

K. COOLING SYSTEM

1. Radiator/Charge Air Cooler _____/_____
 - a. Manufacturer _____/_____
 - b. Type _____/_____
 - c. Model Number _____/_____
 - d. Number of Tubes _____/_____
 - e. Tubes Outer Diameter _____/_____
 - f. Fins Per Inch _____In. / _____In.
 - g. Fin Thickness _____In. / _____In.

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

2. Total Cooling and Heating System Capacity _____ Gals

3. Radiator Fan Speed Control _____ Type

4. Surge Tank Capacity _____ Qts.

6. Overheat Alarm Temperature Sending Unit Setting _____ °F

7. Shutdown Temperature Setting _____ °F

L. TRACTION MOTOR

1. Manufacturer _____

2. Type _____

3. Model Number _____

4. Speeds _____

5. Gear Ratios _____

Forward _____ Reverse _____

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

M. AXLE, REAR

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

N. SUSPENSION SYSTEM

1. Manufacturer _____
2. Type _____
 - a. Front _____
 - b. Rear _____
3. Springs _____
 - a. Front _____
 - b. Rear _____

O. WHEELS AND TIRES

1. Wheels _____
 - a. ~~Make~~ _____
 - b. Size _____ lbs.
 - c. Capacity _____
 - d. Material _____
2. Tires _____
 - a. Manufacturer _____
 - b. Type _____

c. Size

d. Load Range / Air Press. _____lbs./ _____psi

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

P. AXLE, FRONT

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

Q. STEERING, POWER

1. Pump
 - a. Manufacturer _____
 - b. Model _____
 - c. Type _____
 - d. Relief Pressure _____
2. Booster/Gear _____
 - a. Manufacturer _____
 - b. Model Number _____
 - c. Type _____
 - d. Ratio _____
3. Power Steering Fluid Capacity _____ gals
4. Maximum Effort at Steering Wheel _____ lbs.
5. Steering Wheel Diameter _____ in.

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

R. BRAKES

1. Make of Fundamental Brake System _____
2. Brake Chambers Vendor's Size & Part No.
 - a. Front _____
 - b. Rear _____
3. Brake Operation Effort _____
4. Slack Adjuster's Vendor's Type & Part No.
 - a. Front
 - 1) Right _____
 - 2) Left _____
 - b. Rear
 - 1) Right _____
 - 2) Left _____
 - c. Length
 - 1) Front Take-up _____ in.
 - 2) Rear Take-up _____ in.
5. Brake Drums/Discs
 - a. Front
 - 1) Manufacturer _____
 - 2) Part Number _____
 - 3) Diameter _____ in
 - b. Rear
 - 1) Manufacturer _____
 - 2) Part Number _____
 - 3) Diameter _____ in
6. Brake Lining
 - a. Manufacturer _____
 - b. Type _____
7. Brake Lining Identification
 - a. Front
 - 1) Forward _____
 - 2) Reverse _____
 - b. Rear
 - 1) Forward _____
 - 2) Reverse _____

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

S. AIR COMPRESSOR

1. Manufacturer _____
2. Type _____
3. Rated Capacity _____CFM
4. Capacity, at Idle _____CFM
5. Capacity, at Max Speed _____CFM
6. Maximum Warranted Speed _____RPM
7. Speed Idle _____RPM
8. Drive Type _____RPM
9. Governor
 - a. Cut-in Pressure _____PSI
 - b. Cut-Out Pressure _____PSI

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

T. AIR RESERVOIR CAPACITY

1. Supply Reservoir _____ Cu. In.
2. Primary Reservoir _____ Cu. In.
3. Secondary Reservoir _____ Cu. In.
4. Parking Reservoir _____ Cu. In.

U. PASSENGER INTERIOR LIGHTING

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

V. DOORS

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

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

2. Rear

a. Manufacturer of Operating Equipment _____

b. Type of Door _____

c. Type of Operating Equipment _____

W. SEATS

1. Passenger Seats

a. Manufacturer _____

b. Model _____

2. Driver's Seat

a. Manufacturer _____

b. Model _____

X. WHEELCHAIR RAMP EQUIPMENT

1. Manufacturer _____

2. Model Number _____

3. Type _____

4. Capacity _____ Lbs.

5. Dimensions

a. Width of Platform _____ In.

b. Length of Platform _____ In.

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

Y. WHEELCHAIR SECUREMENT EQUIPMENT

1. Manufacturer _____

2. Model Number _____

Z. MIRRORS

	<u>Size</u> <u>Model #</u>	<u>Type</u>	<u>Manufacturer</u>	<u>Mfg. Part #</u>
Right Side Exterior	____	____	_____	_____
Left Side Exterior	____	____	_____	_____
Center Rearview	____	____	_____	_____
Front Entrance Area	____	____	_____	_____
Upper-RH Corner	____	____	_____	_____
Rear Exit Area	____	____	_____	_____

AA. PASSENGER WINDOWS

1. Manufacturer _____

2. Model _____

3. Type _____

4. Number
a. Side _____

b. Rear _____

5. Sizes _____

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

6. Glazing

- a. Type _____
- b. Thickness _____
- c. Color of Tint _____
- d. Light Transmission _____

BB. HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT

- 1. Heating System Capacity _____BTU
- 2. Air Conditioning Capacity _____BTU
- 3. Ventilating Capacity _____CFM
- 4. Compressor
 - a. Manufacturer _____
 - b. Model _____
 - c. No. of Cylinders _____
 - d. Drive Ratio _____
 - e. Max Warranted Speed _____RPM
 - f. Operating Speed _____RPM
 - g. Weight _____Lbs.
 - h. Oil Capacity
 - 1. Dry _____Gals
 - 2. Wet _____Gals
 - i. Refrigerant _____Type _____Lbs.

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

5. Condenser

- a. Manufacturer _____
- b. Model _____
- c. No. of Rows _____
- d. No. of Rows _____
- e. O.D. of Tube _____ In.
- f. Fin Thickness _____ In.

6. Condenser Fan

- a. Manufacturer _____
- b. Model _____
- c. Fan Diameter _____ In.
- d. Speed Maximum _____ RPM
- e. Flow Rate (maximum) _____ CFM

7. Receiver

- a. Manufacturer _____
- b. Model _____
- c. Capacity _____ Lbs.

8. Condenser Fan Drive Motors

- a. Manufacturer _____
- b. Model _____
- c. Type _____
- d. Horse Power _____ HP
- e. Operating Speed _____ RPM

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

9. Evaporator Fan Drive Motors

- a. Manufacturer _____
- b. Model _____
- c. Type _____
- d. Horse Power _____ HP
- e. Operating Speed _____ RPM

10. Evaporator(s)

- a. Manufacturer _____
- b. Model _____
- c. No. of Rows _____
- d. No. of Fins/In. _____
- e. O.D. of Tube _____ In.
- f. Fin Thickness _____ In.
- g. No of Evaporator _____

11. Expansion Valve

- a. Manufacturer _____
- b. Model _____

12. Filter-Drier

- a. Manufacturer _____
- b. Model _____

13. Heater Cores

- a. Manufacturer _____
- b. Model _____
- c. Capacity _____ BTU
- d. No. of Rows _____
- e. No. of Fins/In. _____

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

f. O.D. of Tube _____ In.

g. Fin Thickness _____ In.

h. No. of Heater Cores _____

14. Controls

a. Manufacturer _____

b. Model _____

15. Driver's Heater

a. Manufacturer _____

b. Model Number _____

c. Capacity _____ BTU

16. Ventilation System

a. Type _____

17. Coolant Heater

a. Make _____

b. Model _____

c. Capacity _____ BTU

CC. DESTINATION SIGNS

1. Manufacturer _____

2. Type _____

3. Character Length

a. Front Destination _____ In.

b. Front Run Number _____ In.

c. Side Destination _____ In.

d. Rear Route _____ In.

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

4. Character Height

- a. Front Destination _____ In.
- b. Front Run Number _____ In.
- c. Side Destination _____ In.
- d. Rear Route _____ In.

5. Number of Characters

- a. Front Destination _____ In.
- b. Front Run Number _____ In.
- c. Side Destination _____ In.
- d. Rear Route _____ In.

6. Message Width

- a. Front Destination _____ In.
- b. Front Run Number _____ In.
- c. Side Destination _____ In.
- d. Rear Route _____ In.

DD. COMMUNICATION SYSTEM-GPS

- 1. Manufacturer _____
- 2. Model Number _____

EE. P.A. SYSTEM

- 1. Amplifier
 - a. Manufacturer _____
 - b. Model Number _____

2. Microphone

a. Manufacturer _____

b. Model Number _____

Attachment G – Bidder Vehicle Technical Information

Bidder: _____

3. Internal Speakers

a. Manufacturer _____

b. Model Number _____

c. Number of Speakers _____

4. External Speakers

a. Manufacturer _____

b. Model Number _____

c. Number of Speakers _____

FF. ELECTRICAL

1. Multiplex System

a. Manufacturer _____

b. Model Number _____

2. Batteries

a. Manufacturer _____

b. Model Number _____

c. Type _____

GG. PAINT

1. Exterior Paint

a. Manufacturer _____

b. Paint Code Number _____

c. Warranty _____

Attachment H – Comprehensive Quality Assurance Program Plan

Bidder: _____

The Bidder must provide a detailed written plan as required in Section 2.4.1 for addressing all possible manufacturing, testing, and related issues through a Quality Assurance Organization based on the requirements in Section 3 of IFB, Quality Assurance Provisions. It should be written in a mostly non-technical manner so that any person from the Procuring Agency can readily understand it. The plan must be included in its Bid as Attachment H.

Attachment I- Comprehensive Warranty Program Plan

Bidder: _____

The Bidder must provide a detailed written plan as required in Section 2.4.1 for addressing all possible Warranty requirements described in Section 4, Warranty Provisions. The program plan should be written in a mostly non-technical manner so that any person from the Procuring Agency can readily understand it. The plan must be included with the Bid as Attachment I.

Attachment J – Comprehensive Spare Parts Program Plan

Bidder: _____

The Bidder must provide a detailed written plan as required in Section 2.4.1 for addressing how the bidder will ensure that spare parts will be available during the entire period of each vehicle's useful life. The program plan should be written in a mostly non-technical manner so that any person from the Procuring Agency can readily understand it. The plan must be included with the Bid as Attachment J.

Attachment K – Comprehensive Base Bus and Optional Training Program Plan

Bidder: _____

The Bidder must provide a detailed written plan as required in Section 2.4.1 for addressing how the bidder will ensure that Comprehensive Training Program Plan is implemented. The program plan should be written in a mostly non-technical manner so that any person from the Procuring Agency can readily understand it. The plan must be included with the Bid as Attachment K.

Attachment L – Financial Capability

Bidder: _____

Each Bidder is required to explain any known current or near-term potential risks with its financial capacity and strength that could affect its ability to perform under any contract resulting from award of this solicitation.

Attachment M – Bidder's References Form

Bidder: _____

*Provide references that the Agency can contact to confirm the Bidder's vehicle reliability and manufacturer's credibility. Include at least three (3) references in the Bid response of transit operators with whom the Bidder has manufactured low-floor 40' vehicles in the last three years. The contact person provided must be fully informed about the Bidder's qualifications. **Be sure to include a correct e-mail address.***

Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	
E-Mail Address	
Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	
E-Mail Address	
Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	
E-Mail Address	

Attachment N – Request for Clarifications Form (RFC)

Bidder: _____

Each Bidder should number all of its RFC forms sequentially starting at 1. Please use the electronic version and type information as shown. Submit both a hard copy and the electronic file. The filename should end with the Bidder's name. In addition, Attachments Bidders must enter information from each RFC form into the spreadsheet name "Attachments N,O,P - Clarifications, RAE, Deviations Workbook".

RFC Number	1, 2, 3	Bidder	Big Bus Company
Section Title	IFB Section No.	IFB Subsection No.	IFB Paragraph No.
<i>Type Section Title Here</i>	<i>Type Section No. Here</i>	<i>Type Subsection No Here</i>	<i>Type Paragraph No. Here</i>
List of Attachments:	<ul style="list-style-type: none"> List all Attachments here. Use separate lines for each attachment. 		
Explanation and Justification for Request for Clarification			
<i>Type information here. Please be complete but succinct. Include additional pages if necessary.</i>			

Durham City Use Only

Date of Reply _____

Approved _____

Denied _____

More Information Required _____

Summary of Information Request _____

Addendum # _____

This form is for informational purposes and does not modify the Bid. Bid modifications will only be made by means of issuing an addendum, not through this form. Bidders shall complete all the information as indicated and attach all supporting documentation listed above. Requests shall be numbered sequentially by the Offeror to uniquely identify each request

Attachment O – Request for Approved Equal Form (RAE)

Bidder: _____

Each Bidder should number all of its RAE forms sequentially starting at 1. Please use the electronic version and type information as shown. Submit both a hard copy and the electronic file. The filename should end with the Bidder's name. In addition, Attachments Bidders must enter information from each RAE form into the spreadsheet name "Attachments N,O,P- Clarifications, RAE, Deviations Workbook".

RAE Number	1, 2, 3	Bidder	Big Bus Company
Section Title	IFB Section No.	IFB Subsection No.	IFB Paragraph No.
<i>Type Section Title Here</i>	<i>Type Section No. Here</i>	<i>Type Subsection No Here</i>	<i>Type Paragraph No. Here</i>
List of Attachments:	<ul style="list-style-type: none"> List all Attachments here. Use separate lines for each attachment. 		
Explanation and Justification for Request for Approved Equal			
<i>Type information here. Please be complete but succinct. Include additional pages if necessary.</i>			

Durham City Use Only

Date of Reply _____

Approved _____

Denied _____

More Information Required _____

Summary of Information Request _____

Addendum # _____

This form is for informational purposes and does not modify the Bid. Bid modifications will only be made by means of issuing an addendum, not through this form. Bidders shall complete all the information as indicated and attach all supporting documentation listed above. Requests shall be numbered sequentially by the Offeror to uniquely identify each request

Attachment P – Request for Deviations Form (RFD)

Bidder: _____

Each Bidder should number all of its RFD forms sequentially starting at 1. Please use the electronic version and type information as shown. Submit both a hard copy and the electronic file. The filename should end with the Bidder's name. In addition, Attachments Bidders must enter information from each RFD form into the spreadsheet name "Attachments N,O,P – Clarifications, RAE, Deviations Workbook".

RFD Number	1, 2, 3	Bidder	Big Bus Company
Section Title	IFB Section No.	IFB Subsection No.	IFB Paragraph No.
<i>Type Section Title Here</i>	<i>Type Section No. Here</i>	<i>Type Subsection No Here</i>	<i>Type Paragraph No. Here</i>
List of Attachments:	<ul style="list-style-type: none"> List all Attachments here. Use separate lines for each attachment. 		
Explanation and Justification for Request for Deviation			
<i>Type information here. Please be complete but succinct. Include additional pages if necessary.</i>			

Durham City Use Only

Date of Reply _____

Approved _____

Denied _____

More Information Required _____

Summary of Information Request _____

Addendum # _____

This form is for informational purposes and does not modify the Bid. Bid modifications will only be made by means of issuing an addendum, not through this form. Bidders shall complete all the information as indicated and attach all supporting documentation listed above. Requests shall be numbered sequentially by the Offeror to uniquely identify each request

Attachment Q – Bidder’s Acknowledgement of Addenda

Bidder: _____

This form shall be completed and included in the Bidder’s Bid. Failure to acknowledge receipt of all addenda may cause the bid to be considered nonresponsive to the solicitation. Acknowledged receipt of each addendum must be clearly established and included with the Offer. The undersigned acknowledges receipt of the following addenda to the original IFB.

Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	
Addendum No.		Dated	

By execution below, the Bidder agrees to all terms of its Offer if awarded the Bid

Bidder Name _____

Street Address _____

City, State, Zip _____

Phone _____

Printed Name and Title of
Bidder’s Authorized Signer _____

Signature of Authorized Signer _____

Date of Offer _____

Signature _____

Attachment R – Bidder Questionnaire (Service, Parts, and Distribution)

Bidder: _____

Bidder must provide the names, addresses and telephone numbers of every OEM who will render services and provide parts under a Contract awarded from this solicitation (Use additional sheets if necessary):

Name		Phone	
Address		Fax	
City, State, Zip		Email	

Name		Phone	
Address		Fax	
City, State, Zip		Email	

Name		Phone	
Address		Fax	
City, State, Zip		Email	

Name		Phone	
Address		Fax	
City, State, Zip		Email	

Policy for Delivery of Parts and Components to be purchased for Service and Maintenance

Regular Method of Shipment _____

Cost to Procuring Agency _____

DISTRIBUTION

Number of distribution points from which contract will be serviced: _____ (Use additional sheets if necessary)

Distribution points location (City & State):			
1		6	
2		7	
3		8	
4		9	
5		10	

Attachment S – Cost Analysis Information Form

Bidder: _____

As required by FTA Circular 4220.1F, a cost analysis for the project is required and the Agency is responsible for ensuring that any contract arising from this solicitation is within a responsible range of the cost analysis. To satisfy the cost analysis provision, Bidders are required to submit a list every order of all 40' foot, low-floor battery electric buses, reasonably similar to the specifications herein, which have been delivered from July 1, 2016 through May 1, 2018. The list shall include the purchasing entity name; quantity of vehicles delivered under each purchase order, length of vehicles, and delivered base cost. Add pages as needed.

Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	
E-Mail Address	
Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	
E-Mail Address	
Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	

Attachment S – Cost Analysis Information Form

Bidder: _____

E-Mail Address	
Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	
E-Mail Address	
Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	
E-Mail Address	
Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last Name	
Job Title	
Contact Phone Number	
E-Mail Address	
Agency Full Name	
Agency Acronym	
Address	
City, State, Zip Code	
Contact Person First and Last	

Attachment T- Federal Certification of Restrictions on Lobbying

I, _____, _____, hereby certify on behalf of
(Name) (Title)

_____ that:
(Firm)

- (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 any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.
- (2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for 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 this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

This certification is a material representation of fact upon which reliance is 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 Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty or not less than \$10,000 and not more than \$100,000 for each such failure.

Dated _____

(Name)

(Title)

(Firm)

Attachment U – Transit Vehicle Manufacturer (TVM) Certification

Pursuant to the provisions of Section 105(f) of the Surface Transportation Assistance Act of 1982, each bidder for this contract must certify that it has complied with the requirements of 49 CFR Part 26.49, regarding the participation of Disadvantaged Business Enterprises (DBE) in FTA assisted procurements of transit vehicles. Absent this certification, properly completed and signed, a bid shall be deemed non-responsive.

Certification:

I hereby certify, for the bidder named below, that it has complied with the provisions of 49 CFR Part 26.49 and that I am duly authorized by said bidder to make this certification.

BIDDER/COMPANY

Name of Bidder/Company _____

Signature of Representative _____

Type or Print Name _____

Title _____

Date ____/____/____

NOTARY

Type or Print Name _____

Signature of Notary _____

Place Notary SEAL Here:

**Attachment V – Pre-Award Certification of Compliance with Buy America
Rolling Stock Requirements**

Note: Bidder should only complete one of the certifications below.

Bidder or offeror Certificate of:

COMPLIANCE with Buy America Rolling Stock Requirements

The bidder or offeror hereby certifies that it will comply with the requirements of 49 U.S.C. 5323(j), and the applicable regulations of 49 CFR 661.11.

Company_____

Name_____Title_____

Signature _____Date _____

Bidder or offeror Certificate of:

NON-COMPLIANCE with Buy America Rolling Stock Requirements

The bidder or offeror hereby certifies that it cannot comply with the requirements of 49 U.S.C. 5323(j), but may qualify for an exception to the requirement consistent with 49 U.S.C. 5323(j)(2)(C), and the applicable regulations in 49 CFR 661.7.

Company_____

Name_____Title_____

Signature _____Date _____

**Attachment W – Pre-Award Certification of Compliance with FMVSS Rolling
Stock Requirements**

Bidder or offeror Certificate of:

COMPLIANCE with FMVSS Rolling Stock Requirements

As required by Title 49 of the CFR, Part 663 – Subpart D, _____ (Bidder
Name) certifies that the vehicles, _____ (Make and Model)
to be ordered by the Agency will comply with the relevant Federal Motor Vehicle Safety Standards
issued by the National Highway Traffic Safety Administration in Title 49 of the Code
of Federal Regulations, Part 571.

Date: _____

Signature: _____ Title: _____

Company _____

Name _____ Title _____

Attachment X- Certification Regarding Government-Wide Debarment and Suspension

Instructions for Certification: By signing and submitting this bid or proposal, the prospective lower tier participant is providing the signed certification set out below.

(1) It will comply and facilitate compliance with U.S. DOT regulations, "Nonprocurement Suspension and Debarment," 2 CFR part 1200, which adopts and supplements the U.S. Office of Management and Budget (U.S. OMB) "Guidelines to Agencies on Government-wide Debarment and Suspension (Nonprocurement)," 2 CFR part 180,

(2) To the best of its knowledge and belief, that its Principals and Subrecipients at the first tier:

a. Are eligible to participate in covered transactions of any Federal department or agency and are not presently:

- | | |
|-----|--------------------------|
| (1) | Debarred, |
| (2) | Suspended, |
| (3) | Proposed for debarment, |
| (4) | Declared ineligible, |
| (5) | Voluntarily excluded, or |
| (6) | Disqualified, |

b. Its management has not within a three-year period preceding its latest application or proposal been convicted of or had a civil judgment rendered against any of them for:

- (1) Commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction, or contract under a public transaction,
- (2) Violation of any Federal or State antitrust statute, or
- (3) Commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making any false statement, or receiving stolen property,

c. It is not presently indicted for, or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses listed in the preceding subsection 2.b of this Certification,

d. It has not had one or more public transactions (Federal, State, or local) terminated for cause or default within a three-year period preceding this Certification,

e. If, at a later time, it receives any information that contradicts the statements of subsections 2.a – 2.d above, it will promptly provide that information to FTA,

f. It will treat each lower tier contract or lower tier subcontract under its Project as a covered lower tier contract for purposes of 2 CFR part 1200 and 2CFR part 180 if it:

(1) Equals or exceeds \$25,000, (2) Is for audit services, or
(3) Requires the consent of a Federal official, and

g. It will require that each covered lower tier contractor and subcontractor:

(1) Comply and facilitate compliance with the Federal requirements of 2 CFR parts 180 and 1200, and

(2) Assure that each lower tier participant in its Project is not presently declared by any Federal department or agency to be:

- a. Debarred from participation in its federally funded Project,
- b. Suspended from participation in its federally funded Project,
- c. Proposed for debarment from participation in its federally funded Project,
- d. Declared ineligible to participate in its federally funded Project,
- e. Voluntarily excluded from participation in its federally funded Project, or
- f. Disqualified from participation in its federally funded Project, and

3. It will provide a written explanation as indicated on a page attached in FTA's TEAM-Web or the Signature Page if it or any of its principals, including any of its first tier Subrecipients or its Third Party Participants at a lower tier, is unable to certify compliance with the preceding statements in this Certification Group.

Certification

Contractor _____

Signature of Authorized Official _____ Date ____/____/____

Name and Title of Contractor's Authorized Official _____

Attachment Y – Bus Testing Certification

The undersigned bidder [Contractor/Manufacturer] certifies that the vehicle model or vehicle models offered in this bid submission complies with 49 CFR Part 665.

A copy of the test report (for each bid ITEM) prepared by the Federal Transit Administration's (FTA) Altoona, Pennsylvania Bus Testing Center is attached to this certification and is a true and correct copy of the test report as prepared by the facility.

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 U.S. 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.

Name of Bidder/Company Name

Type or print name

Signature of authorized representative

Signature of notary and SEAL

Date of Signature: ____/____/____

Attachment Z – Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

1. General

Contractor must refer to, complete, and sign all other Attachments to this IFB.

2. Fly America Requirements

Contractor shall comply with 49 USC 40118 (the "Fly America" Act) in accordance with General Services Administration regulations 41 CFR 301-10, stating that recipients and sub recipients of Federal funds and their contractors are required to use US Flag air carriers for US 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. Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a US 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. Contractor shall include the requirements of this section in all subcontracts that may involve international air transportation.

3. Buy America Requirements (Rolling Stock)

Contractor shall comply with 49 USC 5323(j) and 49 CFR 661, as amended by MAP-21 stating 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, and include software, microcomputer equipment and small purchases (currently less than \$100,000) made with capital, operating or planning funds. Separate requirements for rolling stock are stated at 5323(j)(2)(C) and 49 CFR 661.11 and as amended by Map-21 (5325). Rolling stock must be manufactured in the US and have a minimum 60% domestic content and adhere to contract term limitations. A bidder or offeror shall submit appropriate Buy America certification to the recipient with all bids on FTA-funded contracts, except those subject to a general waiver. Proposals not accompanied by a completed Buy America certification shall be rejected as nonresponsive. This requirement does not apply to lower tier subcontractors.

4. Cargo Preference

Contracts involving equipment, materials or commodities which may be transported by ocean vessels. These requirements do not apply to micro-purchases (\$3,000 or less, except for construction contracts over \$2,000). Contractor shall: a. use privately owned US-Flag commercial vessels to ship at least 50% 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 US flag commercial vessels; b. furnish within 20 working days following the loading date of shipments originating within the US or within 30 working days following the loading date of shipments originating outside the US, a legible copy of a rated, "on-board" commercial bill-of-lading in English for each shipment of cargo described herein to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the recipient (through contractor in the case of a subcontractor's bill-of-lading.); c. include these requirements in all subcontracts issued pursuant to this contract when the subcontract involves the transport of equipment, material or commodities by ocean vessel.

5. Energy Conservation

Contractor shall comply with mandatory standards and policies relating to energy efficiency, stated in the state energy conservation plan issued in compliance with the Energy Policy & Conservation Act.

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

6. Clean Water

Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq. Contractor shall report each violation to the recipient and understands and agrees that the recipient shall, in turn, report each violation as required to FTA and the appropriate EPA Regional Office. Contractor shall include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with FTA assistance.

7. Bus Testing

Contractor [manufacturer] shall comply with 49 USC A5323(c) and FTA's implementing regulation 49 CFR 665, to the extent they are consistent with 49 U.S.C. § 5318(e), as amended; and shall perform the following:

1) A manufacturer of a new bus model or a bus produced with a major change in components or configuration shall provide a copy of the final test report to the recipient prior to the recipient's final acceptance of the first vehicle.

2) A manufacturer who releases a report under para. 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 the recipient's final acceptance of the first vehicle. If 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 US before Oct. 1, 1988, and is currently being produced without a major change in configuration or components), the manufacturer shall provide the name and address of the recipient of such a vehicle and the details of that vehicle's configuration and major components.

8. Pre-Award & Post Delivery Audit Requirements

Contractor shall comply with 49 USC 5323(l) and FTA's implementing regulation 49 CFR 663 and submit the following certifications:

1) Buy America Requirements: Contractor shall complete and submit a declaration certifying either compliance or noncompliance with Buy America. If contractor certifies compliance with Buy America, it shall submit documentation listing:

A. Component and subcomponent parts of the rolling stock to be purchased identified by manufacturer of the parts, their country of origin and costs; and

B. 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.

C. Solicitation Specification Requirements: Contractor shall submit evidence that it will be capable of meeting the bid specifications.

D. Federal Motor Vehicle Safety Standards (FMVSS): 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 buses will not be subject to FMVSS regulations.

9. Lobbying

Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, as amended by the Lobbying Disclosure Act of 1995, P.L. 104-65 [to be codified at 2 U.S.C. § 1601, et seq.] - Contractors who apply or bid for an award of

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

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

10. Access to Records and Reports

1. Where the purchaser is not a State but a local government and is an FTA recipient or a subgrantee of FTA recipient in accordance with 49 CFR 18.36(i), contractor shall provide the purchaser, the FTA, the US Comptroller General or their authorized representatives access to any books, documents, papers and contractor records which are pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor shall also, pursuant to 49 CFR 633.17, provide authorized FTA representatives, including any PMO contractor, access to contractor's records and construction sites pertaining to a capital project, defined at 49 USC 5302(a)1, which is receiving FTA assistance through the programs described at 49 USC 5307, 5309 or 5311.

2. Where the purchaser is a State and is an FTA recipient or a subgrantee of FTA recipient in accordance with 49 CFR 633.17, contractor shall provide the purchaser, authorized FTA representatives, including any PMO Contractor, access to contractor's records and construction sites pertaining to a capital project, defined at 49 USC 5302(a)1, which receives FTA assistance through the programs described at 49 USC 5307, 5309 or 5311. By definition, a capital project excludes contracts of less than the simplified acquisition threshold currently set at \$100,000.

3. Where the purchaser enters into a negotiated contract for other than a small purchase or under the simplified acquisition threshold and is an institution of higher education, a hospital or other non-profit organization and is an FTA recipient or a subgrantee of FTA recipient in accordance with 49 CFR 19.48, contractor shall provide the purchaser, the FTA, the US Comptroller General or their authorized representatives, access to any books, documents, papers and record of the contractor which are directly pertinent to this contract for the purposes of making audits, examinations, excerpts and transcriptions.

4. Where a purchaser which is an FTA recipient or a subgrantee of FTA recipient in accordance with 49 USC 5325(a) enters into a contract for a capital project or improvement (defined at 49 USC 5302(a)1) through other than competitive bidding, contractor shall make available records related to the contract to the purchaser, the Secretary of USDOT and the US Comptroller General or any authorized officer or employee of any of them for the purposes of conducting an audit and inspection.

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

6. Contractor shall maintain all books, records, accounts and reports required under this contract for a period of not less than three (3) years after the date of termination or expiration of this contract, except in the event of litigation or settlement of claims arising from the performance of this contract, in which case contractor agrees to maintain same until the recipient, FTA Administrator, US Comptroller General, or any of their authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto. Re: 49 CFR 18.39(i)(11).

FTA does not require the inclusion of these requirements in subcontracts.

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

11. Federal Changes

Contractor shall comply with all applicable FTA regulations, policies, procedures and directives, including without limitation those listed directly or by reference in the Master Agreement between the purchaser and FTA, as they may be amended or promulgated from time to time during the term of the contract.

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

Contractor's failure to comply shall constitute a material breach of the contract.

12. Clean Air

1) Contractor shall comply with all applicable standards, orders or regulations pursuant to the Clean Air Act, 42 USC 7401 et seq. Contractor shall report each violation to the recipient and understands and agrees that the recipient will, in turn, report each violation as required to FTA and the appropriate EPA Regional Office.

2) Contractor shall include these requirements in each subcontract exceeding \$100,000 financed in whole or in part with FTA assistance.

13. Contract Work Hours & Safety Standards Act

(1) Overtime requirements - No contractor or subcontractor contracting for any part of the contract work which 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 para. (1) of this section, contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable 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 para. (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 para. (1) of this section.

(3) Withholding for unpaid wages and liquidated damages - the recipient shall upon its own action or upon written request of USDOL withhold or cause to be withheld, from any moneys payable on account of work performed by 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 & 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 para. (2) of this section.

(4) Subcontracts - Contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. Prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this section.

14. No Government Obligation to Third Parties

(1) The recipient and contractor acknowledge and agree that, notwithstanding any concurrence by the US Government in or approval of the solicitation or award of the underlying contract, absent the express

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

written consent by the US Government, the US Government is not a party to this contract and shall not be subject to any obligations or liabilities to the recipient, the contractor, or any other party (whether or not a party to that contract) pertaining to any matter resulting from the underlying contract.

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

15. Program Fraud and False or Fraudulent Statements or Related Acts

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

(2) If contractor makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submittal, or certification to the US Government under a contract connected with a project that is financed in whole or in part with FTA assistance 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 contractor, to the extent the US Government deems appropriate.

(3) Contractor shall include the above two clauses in each subcontract financed in whole or in part with FTA assistance. The clauses shall not be modified, except to identify the subcontractor who will be subject to the provisions.

16. Termination

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

b. Termination for Default [Breach or Cause] (General Provision) If contractor does not deliver items in accordance with the contract delivery schedule, or, if the contract is for services, and contractor fails to perform in the manner called for in the contract, or if contractor fails to comply with any other provisions of the contract, the recipient may terminate this contract for default. Termination shall be effected by serving a notice of termination to contractor setting forth the manner in which contractor is in default. Contractor shall only be paid the contract price for supplies delivered and accepted, or for services performed in accordance with the manner of performance set forth in the contract.

If it is later determined by the recipient that contractor had an excusable reason for not performing, such as a strike, fire, or flood, events which are not the fault of or are beyond the control of contractor, the recipient, after setting up a new delivery or performance schedule, may allow contractor to continue work, or treat the termination as a termination for convenience.

c. Opportunity to Cure (General Provision) the recipient in its sole discretion may, in the case of a termination for breach or default, allow contractor an appropriately short period of time in which to cure

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

the defect. In such case, the notice of termination shall state the time period in which cure is permitted and other appropriate conditions. If contractor fails to remedy to the recipient's satisfaction the breach or default or any of the terms, covenants, or conditions of this Contract within ten (10) days after receipt by contractor or written notice from the recipient setting forth the nature of said breach or default, the recipient shall have the right to terminate the Contract without any further obligation to contractor. Any such termination for default shall not in any way operate to preclude the recipient from also pursuing all available remedies against contractor and its sureties for said breach or default.

d. **Waiver of Remedies for any Breach** In the event that the recipient elects to waive its remedies for any breach by contractor of any covenant, term or condition of this Contract, such waiver by the recipient shall not limit its remedies for any succeeding breach of that or of any other term, covenant, or condition of this Contract.

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

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

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

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

If this contract is terminated while contractor has possession of the recipient goods, contractor shall, as directed by the recipient, protect and preserve the goods until surrendered to the recipient or its agent. Contractor and the recipient shall agree on payment for the preservation and protection of goods. Failure to agree on an amount shall be resolved under the Dispute clause. If, after termination for failure to fulfill contract obligations, it is determined that contractor was not in default, the rights and obligations of the parties shall be the same as if termination had been issued for the recipient's convenience.

h. **Termination for Default (Construction)** If contractor refuses or fails to prosecute the work or any separable part, with the diligence that will insure its completion within the time specified, or any extension, or fails to complete the work within this time, or if contractor fails to comply with any other provisions of this contract, the recipient may terminate this contract for default. the recipient shall terminate by delivering to contractor a notice of termination specifying the nature of default. In this event, the recipient may take over the work and complete it by contract or otherwise, and may take possession of and use any materials, appliances, and plant on the work site necessary for completing the work. Contractor and its sureties shall be liable for any damage to the recipient resulting from contractor's refusal or failure to complete the work within specified time, whether or not contractor's

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

right to proceed with the work is terminated. This liability includes any increased costs incurred by the recipient in completing the work.

Contractor's right to proceed shall not be terminated nor shall contractor be charged with damages under this clause if:

1. Delay in completing the work arises from unforeseeable causes beyond the control and without the fault or negligence of contractor. Examples of such causes include: acts of God, acts of the recipient, acts of another contractor in the performance of a contract with the recipient, epidemics, quarantine restrictions, strikes, freight embargoes; and

2. Contractor, within 10 days from the beginning of any delay, notifies the recipient in writing of the causes of delay. If in the recipient's judgment, delay is excusable, the time for completing the work shall be extended. The recipient's judgment shall be final and conclusive on the parties, but subject to appeal under the Disputes clauses.

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

i. Termination for Convenience or Default (Architect & Engineering) the recipient may terminate this contract in whole or in part, for the recipient's convenience or because of contractor's failure to fulfill contract obligations. The recipient shall terminate by delivering to contractor a notice of termination specifying the nature, extent, and effective date of termination. Upon receipt of the notice, contractor shall (1) immediately discontinue all services affected (unless the notice directs otherwise), and (2) deliver to the recipient all data, drawings, specifications, reports, estimates, summaries, and other information and materials accumulated in performing this contract, whether completed or in process. If termination is for the recipient's convenience, it shall make an equitable adjustment in the contract price but shall allow no anticipated profit on unperformed services. If termination is for contractor's failure to fulfill contract obligations, the recipient may complete the work by contract or otherwise and contractor shall be liable for any additional cost incurred by the recipient.

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

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

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

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

17. Government Wide Debarment and Suspension (Non Procurement)

The Recipient agrees to the following: (1) It will comply with the requirements of 2 C.F.R. part 180, subpart C, as adopted and supplemented by U.S. DOT regulations at 2 C.F.R. part 1200, which include the following: (a) It will not enter into any arrangement to participate in the development or implementation of the Project with any Third Party Participant that is debarred or suspended except as authorized by: 1 U.S. DOT regulations, "Nonprocurement Suspension and Debarment," 2 C.F.R. part 1200, 2 U.S. OMB, "Guidelines to Agencies on Government wide Debarment and Suspension Nonprocurement)," 2 C.F.R. part 180, including any amendments thereto, and 3 Executive Orders Nos. 12549 and 12689, "Debarment and Suspension," 31 U.S.C. § 6101 note, (b) It will review the U.S. GSA "System for Award Management," <https://www.sam.gov>, if required by U.S. DOT regulations, 2 C.F.R. part 1200, and (c) It will include, and require each of its Third Party Participants to include, a similar provision in each lower tier covered transaction, ensuring that each lower tier Third Party Participant: 1 Will comply with Federal debarment and suspension requirements, and 2 Reviews the "System for Award Management" at <https://www.sam.gov>, if necessary to comply with U.S. DOT regulations, 2 C.F.R. part 1200, and (2) If the Recipient suspends, debars, or takes any similar action against a Third Party Participant or individual, the Recipient will provide immediate written notice to the: (a) FTA Regional Counsel for the Region in which the Recipient is located or implements the Project, (b) FTA Project Manager if the Project is administered by an FTA Headquarters Office, or (c) FTA Chief Counsel.

18. Contracts Involving Federal Privacy Act Requirements

When a grantee maintains files on drug and alcohol enforcement activities for FTA, and those files are organized so that information could be retrieved by personal identifier, the Privacy Act requirements apply to all contracts except micro-purchases (\$3,000 or less, except for construction contracts over \$2,000).

The following requirements apply to the Contractor and its employees that administer any system of records on behalf of the Federal Government under any contract:

(1) The Contractor agrees to comply with, and assures the compliance of its employees with, the information restrictions and other applicable requirements of the Privacy Act of 1974, 5 U.S.C. § 552a. Among other things, the Contractor agrees to obtain the express consent of the Federal Government before the Contractor or its employees operate a system of records on behalf of the Federal Government. The Contractor understands that the requirements of the Privacy Act, including the civil and criminal penalties for violation of that Act, apply to those individuals involved, and that failure to comply with the terms of the Privacy Act may result in termination of the underlying contract.

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

19. Civil Rights Requirements

The following requirements apply to the underlying contract:

The Recipient understands and agrees that it must comply with applicable Federal civil rights laws and regulations, and follow applicable Federal guidance, except as the Federal Government determines otherwise in writing. Therefore, unless a Recipient or Program, including an Indian Tribe or the Tribal Transit Program, is specifically exempted from a civil rights statute, FTA requires compliance with that civil rights statute, including compliance with equity in service:

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

a. Nondiscrimination in Federal Public Transportation Programs. The Recipient agrees to, and assures that each Third Party Participant will, comply with Federal transit law, 49 U.S.C. § 5332 (FTA's "Nondiscrimination" statute): (1) FTA's "Nondiscrimination" statute prohibits discrimination on the basis of: (a) Race, (b) Color, (c) Religion, (d) National origin, (e) Sex, (f) Disability, or (g) Age, and (2) The FTA "Nondiscrimination" statute's prohibition against discrimination includes: (a) Exclusion from participation, (b) Denial of program benefits, or (c) Discrimination, including discrimination in employment or business opportunity, (3) Except as FTA determines otherwise in writing: (a) General. Follow: 1 The most recent edition of FTA Circular 4702.1, "Title VI Requirements and Guidelines for Federal Transit Administration Recipients," to the extent consistent with applicable Federal laws, regulations, and guidance, and 2 Other applicable Federal guidance that may be issued, but (b) Exception for the Tribal Transit Program. FTA does not require an Indian Tribe to comply with FTA program-specific guidelines for Title VI when administering its projects funded under the Tribal Transit Program,

b. Nondiscrimination – Title VI of the Civil Rights Act. The Recipient agrees to, and assures that each Third Party Participant will: (1) Prohibit discrimination based on: (a) Race, (b) Color, or (c) National origin, (2) Comply with: (a) Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000d et seq., (b) U.S. DOT regulations, "Nondiscrimination in Federally-Assisted Programs of the Department of Transportation – Effectuation of Title VI of the Civil Rights Act of 1964," 49 C.F.R. part 21, and (c) Federal transit law, specifically 49 U.S.C. § 5332, as stated in the preceding section a, and (3) Except as FTA determines otherwise in writing, follow: (a) The most recent edition of FTA Circular 4702.1, "Title VI and Title VI-Dependent Guidelines for Federal Transit Administration Recipients," to the extent consistent with applicable Federal laws, regulations, and guidance. (b) U.S. DOJ, "Guidelines for the enforcement of Title VI, Civil Rights Act of 1964," 28 C.F.R. § 50.3, and (c) Other applicable Federal guidance that may be issued,

c. Equal Employment Opportunity. (1) Federal Requirements and Guidance. The Recipient agrees to, and assures that each Third Party Participant will, prohibit discrimination on the basis of race, color, religion, sex, or national origin, and: (a) Comply with Title VII of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000e et seq., (b) Facilitate compliance with Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order No. 11246, Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note, (c) Comply with Federal transit law, specifically 49 U.S.C. § 5332, as stated in section a, and (d) Comply with other applicable EEO laws and regulations, as provided in Federal guidance, including laws and regulations prohibiting discrimination on the basis of disability, except as the Federal Government determines otherwise in writing, (2) General. The Recipient agrees to: (a) Ensure that applicants for employment are employed and employees are treated during employment without discrimination on the basis of their: 1 Race, 2 Color, 3 Religion, 4 Sex, 5 Disability, 6 Age, or 7 National origin, (b) Take affirmative action that includes, but is not limited to: 1 Recruitment advertising, 2 Recruitment, 3 Employment, 4 Rates of pay, 5 Other forms of compensation, 6 Selection for training, including apprenticeship, 7 Upgrading, 8 Transfers, 9 Demotions, 10 Layoffs, and 11 Terminations, but (b) Indian Tribe. Title VII of the Civil Rights Act of 1964, as amended, exempts Indian Tribes under the definition of "Employer". (3) Equal Employment Opportunity Requirements for Construction Activities. In addition to the foregoing, when undertaking "construction" as recognized by the U.S.

Department of Labor (U.S. DOL), the Recipient agrees to comply, and assures the compliance of each Third Party Participant, with: (a) U.S. DOL regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. chapter 60, and (b) Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order No. 11246, Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note,

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

d. Disadvantaged Business Enterprise. To the extent authorized by applicable Federal law, the Recipient agrees to facilitate, and assures that each Third Party Participant will facilitate, participation by small business concerns owned and controlled by socially and economically disadvantaged individuals, also referred to as "Disadvantaged Business Enterprises" (DBEs), in the Project as follows: 1) Requirements. The Recipient agrees to comply with: (a) Section 1101(b) of MAP-21, 23 U.S.C. § 101 note, (b) U.S. DOT regulations, "Participation by Disadvantaged Business Enterprises in Department of Transportation Financial Assistance Programs," 49 C.F.R. part 26, and (c) Federal transit law, specifically 49 U.S.C. § 5332, as stated in section a, (2) Assurance. As required by 49 C.F.R. § 26.13(a), (b) DBE Program Requirements. Recipients receiving planning, capital and/or operating assistance that will award prime third party contracts exceeding \$250,000 in a Federal fiscal year must: 1 Have a DBE program meeting the requirements of 49 C.F.R. part 26, 2 Implement a DBE program approved by FTA, and 3 Establish an annual DBE participation goal, (c) Special Requirements for a Transit Vehicle Manufacturer. The Recipient understands and agrees that each transit vehicle manufacturer, as a condition of being authorized to bid or propose on FTA-assisted transit vehicle procurements, must certify that it has complied with the requirements of 49 C.F.R. part 26, (d) the Recipient provides assurance that: The Recipient shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any DOT-assisted contract or in the administration of its DBE program or the requirements of 49 C.F.R. part 26.

The Recipient shall take all necessary and reasonable steps under 49 C.F.R. part 26 to ensure nondiscrimination in the award and administration of DOT-assisted contracts. The Recipient's DBE program, as required by 49 C.F.R. part 26 and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the Recipient of its failure to carry out its approved program, the Department may impose sanctions as provided for under 49 C.F.R. part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. § 1001 and/or the Program Fraud Civil Remedies Act of 1986, 31 U.S.C. § 3801 et seq., (2) Exception for the Tribal Transit Program. FTA exempts Indian tribes from the Disadvantaged Business Enterprise regulations at 49 C.F.R. part 26 under MAP-21 and previous legislation, e. Nondiscrimination on the Basis of Sex. The Recipient agrees to comply with Federal prohibitions against discrimination on the basis of sex, including: (1) Title IX of the Education Amendments of 1972, as amended, 20 U.S.C. § 1681 et seq., (2) U.S. DOT regulations, "Nondiscrimination on the Basis of Sex in Education Programs or Activities Receiving Federal Financial Assistance," 49 C.F.R. part 25, and (3) Federal transit law, specifically 49 U.S.C. § 5332, as stated in section a.

f. Nondiscrimination on the Basis of Age. The Recipient agrees to comply with Federal prohibitions against discrimination on the basis of age, including: (1) The Age Discrimination in Employment Act (ADEA), 29 U.S.C. §§ 621 – 634, which prohibits discrimination on the basis of age, (2) U.S. Equal Employment Opportunity Commission (U.S. EEOC) regulations, "Age Discrimination in Employment Act," 29 C.F.R. part 1625, which implements the ADEA, (3) The Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6101 et seq., which prohibits discrimination against individuals on the basis of age in the administration of programs or activities receiving Federal funds, (4) U.S. Health and Human Services regulations, "Nondiscrimination on the Basis of Age in Programs or Activities Receiving Federal Financial Assistance," 45 C.F.R. part 90, which implements the Age Discrimination Act of 1975, and (5) Federal transit law, specifically 49 U.S.C. § 5332, as stated in section a, g. Nondiscrimination on the Basis of Disability. The Recipient agrees to comply with the following Federal prohibitions pertaining to discrimination against seniors or individuals with disabilities: (1) Federal laws, including: (a) Section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, which prohibits discrimination on the basis of disability in the administration of federally funded programs or activities, (b) The Americans with Disabilities Act of 1990 (ADA), as amended, 42 U.S.C. § 12101 et seq., which requires that accessible facilities and services be made available to individuals with disabilities, 1 General. Titles I, II, and III of the ADA apply to FTA Recipients, but 2 Indian Tribes. While Titles II and III of the ADA apply to Indian

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

Tribes, Title I of the ADA exempts Indian Tribes from the definition of “employer,” (c) The Architectural Barriers Act of 1968, as amended, 42 U.S.C. § 4151 et seq., which requires that buildings and public accommodations be accessible to individuals with disabilities, (d) Federal transit law, specifically 49 U.S.C. § 5332, which now includes disability as a prohibited basis for discrimination, and (e) Other applicable laws and amendments pertaining to access for elderly individuals or individuals with disabilities, (2) Federal regulations, including: (a) U.S. DOT regulations, “Transportation Services for Individuals with Disabilities (ADA),” 49 C.F.R. part 37, (b) U.S. DOT regulations, “Nondiscrimination on the Basis of Disability in Programs and Activities Receiving or Benefiting from Federal Financial Assistance,” 49 C.F.R. part 27, (c) U.S. DOT regulations, “Transportation for Individuals with Disabilities: Passenger Vessels,” 49 C.F.R. part 39, (d) Joint U.S. Architectural and Transportation Barriers Compliance Board (U.S. ATBCB) and U.S. DOT regulations, “Americans With Disabilities (ADA) Accessibility Specifications for Transportation Vehicles,” 36 C.F.R. part 1192 and 49 C.F.R. part 38, (e) U.S. DOJ regulations, “Nondiscrimination on the Basis of Disability in State and Local Government Services,” 28 C.F.R. part 35, (f) U.S. DOJ regulations, “Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities,” 28 C.F.R. part 36, (g) U.S. EEOC, “Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act,” 29 C.F.R. part 1630, (h) U.S. Federal Communications Commission regulations, “Telecommunications Relay Services and Related Customer Premises Equipment for Persons with Disabilities,” 47 C.F.R. part 64, Subpart F, (i) U.S. ATBCB regulations, “Electronic and Information Technology Accessibility Standards,” 36 C.F.R. part 1194, and (j) FTA regulations, “Transportation for Elderly and Handicapped Persons,” 49 C.F.R. part 609, and (3) Other applicable Federal civil rights and nondiscrimination guidance,

h. Drug or Alcohol Abuse - Confidentiality and Other Civil Rights Protections. The Recipient agrees to comply with the confidentiality and civil rights protections of: (1) The Drug Abuse Office and Treatment Act of 1972, as amended, 21 U.S.C. § 1101 et seq., (2) The Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970, as amended, 42 U.S.C. § 4541 et seq., and (3) The Public Health Service Act, as amended, 42 U.S.C. §§ 290dd – 290dd-2, i. Access to Services for People with Limited English Proficiency. Except as the Federal Government determines otherwise in writing, the Recipient agrees to promote accessibility of public transportation services to people whose understanding of English is limited by following: 1) Executive Order No. 13166, “Improving Access to Services for Persons with Limited English Proficiency,” August 11, 2000, 42 U.S.C. § 2000d-1 note, and (2) U.S. DOT Notice, “DOT Policy Guidance Concerning Recipients’ Responsibilities to Limited English Proficiency (LEP) Persons,” 70 Fed. Reg. 74087, December 14, 2005,

j. Other Nondiscrimination Laws. Except as the Federal Government determines otherwise in writing, the Recipient agrees to: (1) Comply with other applicable Federal nondiscrimination laws and regulations, and (2) Follow Federal guidance prohibiting discrimination.

k. Remedies. Remedies for failure to comply with applicable Federal Civil Rights laws and Federal regulations may be enforced as provided in those Federal laws or Federal regulations.

20. Breaches and Dispute Resolution

Disputes arising in the performance of this contract which are not resolved by agreement of the parties shall be decided in writing by the recipient’s authorized representative. This decision shall be final and conclusive unless within ten (10) days from the date of receipt of its copy, contractor mails or otherwise furnishes a written appeal to the recipient’s CEO. In connection with such appeal, contractor shall be afforded an opportunity to be heard and to offer evidence in support of its position. The decision of the recipient’s CEO shall be binding upon contractor and contractor shall abide by the decision. FTA has a vested interest in the settlement of any violation of Federal law including the False Claims Act, 31 U.S.C. § 3729.

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

Performance During Dispute - Unless otherwise directed by the recipient, contractor shall continue performance under this contract while matters in dispute are being resolved.

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

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

Rights and Remedies - Duties and obligations imposed by the contract documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by the recipient or contractor shall constitute a waiver of any right or duty afforded any of them under the contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

21. Disadvantaged Business Enterprise

a. 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 national goal for participation of Disadvantaged Business Enterprises (DBE) is 10%. The recipient's overall goal for DBE participation is listed elsewhere. If a separate contract goal for DBE participation has been established for this procurement, it is listed elsewhere.

b. The contractor shall not discriminate on the basis of race, color, religion, 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 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 the municipal corporation deems appropriate. Each subcontract the contractor signs with a subcontractor must include the assurance in this paragraph (see 49 CFR 26.13(b)).

c. If a separate contract goal has been established, Bidders/offers are required to document sufficient DBE participation to meet these goals or, alternatively, document adequate good faith efforts to do so, as provided for in 49 CFR 26.53.

d. If no separate contract goal has been established, the successful bidder/offeror will be required to report its DBE participation obtained through race-neutral means throughout the period of performance.

e. The contractor is required to pay its subcontractors performing work related to this contract for satisfactory performance of that work no later than 30 days after the contractor's receipt of payment for that work from the recipient. In addition, the contractor may not hold retainage from its subcontractors or must return any retainage payments to those subcontractors within 30 days after the subcontractor's work related to this contract is satisfactorily completed or must return any retainage payments to those subcontractors within 30 days after incremental acceptance of the subcontractor's work by the recipient and contractor's receipt of the partial retainage payment related to the subcontractor's work.

f. The contractor must promptly notify the recipient whenever a DBE subcontractor performing work related to this contract is terminated or fails to complete its work, and must make good faith efforts to engage another DBE subcontractor to perform at least the same amount of work. The contractor may not terminate any DBE subcontractor and perform that work through its own forces or those of an affiliate without prior written consent of the recipient.

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

22. Prompt payment

The prime contractor agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than 30 days from the receipt of each payment the prime contract receives from the Recipient. The prime contractor agrees further to return retainage payments to each subcontractor within 30 days after the subcontractors work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the Recipient. This clause applies to both DBE and non-DBE subcontracts.

23. Incorporation of Federal Transit Administration (FTA) Terms

The preceding provisions include, in part, certain Standard Terms & Conditions required by USDOT, whether or not expressly stated in the preceding contract provisions. All USDOT- required contractual provisions, as stated in FTA Circular 4220.1F, 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 request that would cause the recipient to be in violation of FTA terms and conditions.

24. Access Requirements for Persons with Disabilities

Contractor shall comply with 49 USC 5301(d), stating Federal policy that the elderly and persons with disabilities have the same rights as other persons to use mass transportation services and facilities and that special efforts shall be made in planning and designing those services and facilities to implement that policy. Contractor shall also comply with all applicable requirements of Sec. 504 of the Rehabilitation Act (1973), as amended, 29 USC 794, which prohibits discrimination on the basis of handicaps, and the Americans with Disabilities Act of 1990 (ADA), as amended, 42 USC 12101 et seq., which requires that accessible facilities and services be made available to persons with disabilities, including any subsequent amendments thereto.

25. Notification of Federal Participation

To the extent required by law, in the announcement of any third party contract award for goods and services (including construction services) having an aggregate value of \$500,000 or more, contractor shall specify the amount of Federal assistance to be used in financing that acquisition of goods and services and to express that amount of Federal assistance as a percentage of the total cost of the third party contract.

26. Ineligible Contractors and Subcontractors

Any name appearing upon the Comptroller General's list of ineligible contractors for federally- assisted contracts shall be ineligible to act as a subcontractor for contractor pursuant to this contract. If contractor is on the Comptroller General's list of ineligible contractors for federally financed or assisted construction, the recipient shall cancel, terminate or suspend this contract.

27. Compliance with Federal Regulations

Any contract entered pursuant to this solicitation shall contain the following provisions: All USDOT-required contractual provisions, as set forth in FTA Circular 4220.1F, are incorporated by reference. Anything to the contrary herein notwithstanding, FTA mandated terms shall control in the event of a conflict with other provisions contained in this Agreement. Contractor shall not perform any act, fail to perform any act, or refuse to comply with any grantee request that would cause the recipient to be in violation of FTA terms and conditions. Contractor shall comply with all applicable FTA regulations, policies, procedures and directives, including, without limitation, those listed directly or incorporated by reference in the Master Agreement between the recipient and FTA, as 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.

Attachment Z: Federal Requirements and Special Conditions for Rolling Stock

Bidder Name: _____

28. Access to Services for Persons with Limited English Proficiency

To the extent applicable and except to the extent that FTA determines otherwise in writing, the Recipient agrees to comply with the policies of Executive Order No. 13166, "Improving Access to Services for Persons with Limited English Proficiency," 42 U.S.C. § 2000d 1 note, and with the provisions of U.S. DOT Notice, "DOT Guidance to Recipients on Special Language Services to Limited English Proficient (LEP) Beneficiaries," 70 Fed. Reg. 74087, December 14, 2005.

29. Environmental Justice

Except as the Federal Government determines otherwise in writing, the Recipient agrees to promote environmental justice by following: (1) Executive Order No. 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low- Income Populations," February 11, 1994, 42 U.S.C. § 4321 note, as well as facilitating compliance with that Executive Order, and (2) DOT Order 5610.2, "Department of Transportation Actions To Address Environmental Justice in Minority Populations and Low-Income Populations," 62 Fed. Reg. 18377, April 15, 1997, and (3) The most recent and applicable edition of FTA Circular 4703.1, "Environmental Justice Policy Guidance for Federal Transit Administration Recipients," August 15, 2012, to the extent consistent with applicable Federal laws, regulations, and guidance.

30. Environmental Protections

Compliance is required with any applicable Federal laws imposing environmental and resource conservation requirements for the project. Some, but not all, of the major Federal laws that may affect the project include: the National Environmental Policy Act of 1969; the Clean Air Act; the Resource Conservation and Recovery Act; the Comprehensive Environmental response, Compensation and Liability Act; as well as environmental provisions with Title 23 U.S.C., and 49 U.C. chapter 53. The U.S. EPA, FHWA and other federal agencies may issue other federal regulations and directives that may affect the project. Compliance is required with any applicable Federal laws and regulations in effect now or that become effective in the future.

Attachment AA – Bidder Signature Page Agreeing to All Federal Requirements

Bidder: _____

This form shall be completed and included in the Bidder's Bid to confirm its agreement to follow all Federal Requirements in Attachment Z, Federal Requirements and Special Conditions for Rolling Stock. Failure to complete and sign this form may deem a Bid non-responsive.

By execution below, the Bidder agrees to all Federal Requirements in this solicitation package.

Bidder Name

Street Address

City, State, Zip

Phone

Printed Name and Title of
Bidder's Authorized Signer

Signature of Authorized
Signer

Date of Offer

Attachment AB – Bidder’s Offer

Bidder: _____

By execution of Attachment AB, the Bidder hereby offers to furnish equipment and services as specified in the City of Durham Bus Purchase Invitation For Bids No. P18-108, including: Section 2, Solicitation, Offer, and Award; Section 3, General Contractual Provisions; Section 4, Quality Assurance Provisions and Attachment E; Section 5, Warranty Provisions and Attachment F; Section 6, Training Specifications, and Section 7, Technical Specifications and other required in all Attachments to the IFB. The Bidder also certifies that the Bid will be good for 90 days after the Bid Submission Date.

By execution below, the Bidder agrees to all terms of its Offer if awarded the Bid

Bidder Name

Street Address

City, State, Zip

Phone

Printed Name and Title of
Bidder’s Authorized Signer

Signature of Authorized
Signer

Date of Offer

PURCHASE CONTRACT (Sample)

This contract is dated, made, and entered into this _____ day of _____ between the City of Durham, a N.C. municipal corporation (the "City") and _____ ("Seller," "Vendor," and "Contractor").

- I. This contract is for purchase of ready mix contract
- II. Seller is a (*check one*): _____ corporation; _____ limited liability company; _____ limited partnership; _____ general partnership; _____ proprietorship.
- III. If Seller is a corporation, limited liability company, or limited partnership, Seller is organized under the laws of the State of _____.

IT IS AGREED:

1. Seller, in consideration of the sums to be paid as provided in this contract, including in accordance with section 3 below, agrees to sell to the City, and the City agrees to purchase, at the times and prices, and in the quantities and qualities, the goods described in the following exhibits, which are made a part of this contract:

<input checked="" type="checkbox"/> Instructions to Bidders	<input checked="" type="checkbox"/> Special Conditions	<input checked="" type="checkbox"/> Standard Contract Terms – Exhibit Con
<input checked="" type="checkbox"/> Bidder Information Form	<input checked="" type="checkbox"/> General Conditions	<input checked="" type="checkbox"/> Insurance Clause – Exhibit Ins
<input checked="" type="checkbox"/> Bid Proposal Form	<input checked="" type="checkbox"/> Specifications	

2. In the files of the City's Purchasing Division, this contract is known as Bid No. _____. The City's contract information under the Notice section of the Standard Contract Terms is Jonathan Hawley/ City of Durham/ 101 City Hall Plaza/Durham, NC 27701-3329/Fax: (919) 560-4132 ext. 18225/Email: Jonathan.Hawley@durhamnc.gov

3. The City shall make payment in the amount required by this contract after Seller's satisfactory completion of performance, in accordance with the billing and payment clauses. The sum to be paid under this contract is \$< > .

WHEREFORE, the City has caused this contract to be executed under authority of its City Council, and Seller (if corporate) has executed this contract under seal by authority of its board of directors; if not corporate, Seller has executed this contract under seal pursuant to proper authority.

ATTEST:

CITY OF DURHAM :

.....
The individuals executing this contract for Seller warrant that they have authority to execute this contract on behalf of Seller.
Signature of Seller

Instructions for Completing Contract

1. Unless the City specifies otherwise, Seller must complete and sign this contract in duplicate originals and return it within the time period, if any, specified by the City in its request for Seller to sign, to the City's Purchasing Division for execution by the City. After the City signs the contract, the City will return a copy signed by the City. The Purchase Contract signed by Seller is to be received by the City within 10 days after the date of this communication.
2. **Seller's Status; Authorized Signers.** One of these subsections (a, b, or c) applies.
 - (a) **SELLER IS A CORPORATION.** If Seller is a **corporation --**
 - (i) The corporation agrees that it is signing the contract under seal.
 - (ii) The full correct corporate name must be used. If a corporate division is involved, the corporation (not the division) should execute the contract.
 - (iii) This signature must be that of one of the following: (1) chairperson, president, chief executive officer, vice-president, assistant vice-president, treasurer, chief financial officer, or (2) a person authorized by the board of directors to execute contracts in general or this particular contract.
 - (iv) If someone other than chairperson, president, chief executive officer, vice-president, assistant vice-president, treasurer, chief financial officer signs, then you must attach a copy of the resolution of the board of directors authorizing the other person to sign the contract. That copy of the resolution must be certified by a corporate secretary, with the corporation's seal impressed on it. A resolution in the following form will comply with the requirements of this subpart "iv," although other forms may also be acceptable:

Resolution Authorizing Execution of Contracts

RESOLVED, that [insert name of person authorized to sign] shall have authority to enter into contracts with the City of Durham, N.C., in the name of and on behalf of [insert corporation's name] related to City of Durham Bid No. [insert bid number].

I, a Secretary or Assistant Secretary of the corporation whose name is stated above, certify that the foregoing is a true copy of a resolution duly adopted by the Board of Directors of the corporation, and that the resolution is still in effect.

This the _____ day of _____, 20____.

(Affix corporate seal)

Secretary of Assistant Secretary

(b) SELLER IS A LIMITED LIABILITY COMPANY. If Seller is a **limited liability company**, a manager is the standard person to sign. If the LLC's "operating agreement" specifically says that someone else may sign contracts, and that other person is signing this contract, please provide a copy of the following from the operating agreement: pages 1, 2, and signature pages; and the page containing the appointment of the person who is signing other than the LLC's manager. Please mark the text that makes that appointment.

(c) SELLER IS AN INDIVIDUAL OR PARTNERSHIP. If Seller is an **individual**, including an individual doing business under a business name, the individual owner must sign. If Seller is a **partnership**, a general partner must sign.

3. **Signature Format.** The City's Purchasing Division will provide a signature section that it thinks is appropriate based on information it has. Do not alter the documents without first obtaining authorization from the Purchasing Division. If the signature section does not fit your situation, please consult the Purchasing Division.

4. **Summary of Goods and Services.** The description in section I (which begins "This contract is for...") on the front of this document is only a summary and is intended only for general reference. The details of the purchase are described elsewhere and control over this summary.

CITY OF DURHAM EQUAL BUSINESS OPPORTUNITY PROGRAM

PROCUREMENT FORMS

Revised 3/2016



Street Address:

Phone: 919-560-4180
Facsimile: 919-560-4513

**101 City Hall Plaza (Annex)
Durham, North Carolina 27701**

The Department of Equal Opportunity/Equity Assurance
Good Things Are Happening In Durham

Equal Business Opportunity Program

UBE Procurement Documentation

All information in this document is applicable as indicated when UBE goals are required. If documents are not submitted, your bid may be deemed non-responsive. Only the Employee Breakdown form is required when there are no UBE goals. Underutilized Business Enterprise (UBE) means a business, including a sole proprietorship, partnership, corporation, limited liability company, joint venture or any other business or professional entity that has been certified by (i) the State of North Carolina as a historically underutilized business (HUB) pursuant to G.S. 143-128.4, as amended; (ii) the North Carolina Department of Transportation as a disadvantaged minority-owned or woman-owned business pursuant to G.S. 136-28.4, as amended; or (iii) the Small Business Administration 8(a) Business Development program of the Small Business Administration of the U.S. Department of Commerce pursuant to 15 U.S.C. 637(a), as amended,

UBE Participation On this form, “participation” is the dollar amount of subcontracts for significant goods and services to be used to perform the contract. For instance, if the bidder would enter into a subcontract with UBEs for a total of \$30,000, that would be the UBE participation amount. The sum of UBE participation and non UBE participation should equal the amount of the bid. This form is required for a bid that has participation goals and must be completed and submitted with your bid.

Employee Breakdown must be completed and submitted for the location providing the service/commodity. If the parent company will be involved in providing the service/commodity on the City contract, a consolidated employment breakdown must be submitted.

Statement of Intent to Perform as Subcontractor The bidder must provide one of these forms for each UBE firm that the bidder would subcontract with if the City awards the contract to the bidder.

Request to Change UBE Participation After Bid Opening: If at any time during a City contract, the bidder/contractor proposes to do any of the following :

- to replace a subcontractor,
- to perform subcontracted work with the bidder/contractor’s own forces,
- to increase the quantity of subcontracted work,
- to decrease the quantity of subcontracted work, or
- to change the allocation of work among subcontractors,

then the bidder/contractor must make good-faith efforts to attain the goals that it has shown on the UBE Participation form, and the bidder/contractor must fill out the Request to Change UBE Participation After Bid Opening. Substitutions of subcontractors in these circumstances, both before and after the awarding of a contract, are subject to City approval. Consult the City’s EO/EA Department on the procedures to follow.

Questionnaire on Bidder’s Good-Faith Efforts Bidders that do not attain the UBE goals have the responsibility to make good-faith efforts and to demonstrate to the City that they have made such efforts. In determining a bidder’s good-faith efforts to engage UBEs, the City Manager shall consider the information supplied by the bidder to answer the questions in this form, along with other criteria that the City Manager deems proper. This questionnaire is an optional tool that bidders may use to show that they have made good-faith efforts. Even though this form may be submitted after the bid opening, it cannot include information on efforts made after the bid opening. Even if a bidder does not use this form, the City will nevertheless attempt to answer the questions on the questionnaire using good-faith documentation supplied by the bidder. Bidders who do not turn in the questionnaire will still find it helpful to know how the City will determine whether good-faith efforts have been made.

EMPLOYEE BREAKDOWN

Part A – Employee Statistics for the Primary Location

M-----a-----l-----e-----s

F---e---m---a---l---e---s

Employment Category	Total Employees	Total Males	Total Females	White	Black	Hispanic	Asian or Pacific Islander	Indian or Alaskan Native	White	Black	Hispanic	Asian or Pacific Islander	Indian or Alaskan Native
Project Manger													
Professional													
Labor													
Clerical													
Totals													

Part B – Employee Statistics for the Consolidated Company (See instructions for this form on whether this part is required.)

M-----a-----l-----e-----s

F---e---m---a---l---e---s

Employment Category	Total Employees	Total Males	Total Females	White	Black	Hispanic	Asian or Pacific Islander	Indian or Alaskan Native	White	Black	Hispanic	Asian or Pacific Islander	Indian or Alaskan Native
Project Manger													
Professional													
Labor													
Clerical													
Totals													

UBE PARTICIPATION ON BID

Name of Bidder: _____

Is bidder a UBE (circle one): Yes No

Total dollar amount of UBE participation in bid work: _____

For each row, check one column: E or F, .

Column A	Column B	Column C	Column D	Column E	Column F
Name of proposed subcontractor for base bid work	Goods and services to be provided for base bid work	Subcontract amount, in dollars, for base bid work	Percentage of total base bid (Column C divided by total base bid)	Minority-owned UBE	Women-owned UBE
		\$	%		
		\$	%		
		\$	%		
		\$	%		

Attach extra sheets as needed.

Do the above participation amounts meet the goals on this contract, assuming only the base bid is counted?

☐ **Yes** ☐ **No**. If the answer is No: (1) the bidder must have made good-faith efforts; (2) the bidder must provide, within 2 business days after bid opening, documentation of good-faith efforts; and (3) the bidder must sign below.

As an authorized representative of the Bidder, I swear or affirm under penalty of fraud that the good-faith efforts documentation submitted with this bid, pertaining to the base bid and all alternates, if any, is correct and not intended to defraud or mislead. After the contract between the City and the Bidder is signed, except to the extent that the City gives prior written approval for changes, the Contractor agrees that it shall engage the subcontractors listed on this form to perform the work for the dollar amounts or percentages described on this form.

Signature of individual authorized to sign for Bidder

STATEMENT OF INTENT TO PERFORM AS SUBCONTRACTOR

Name of **Bidder**: _____

Name of **Project**: _____

The undersigned firm meets the City of Durham's criteria as a UBE.

The undersigned UBE represents that it will enter into a formal contract with the Bidder to perform the following work in connection with the Project, in the dollar amount or percentage listed below, if the Bidder signs a contract with the City of Durham for the Project.

Describe the work in sufficient detail so that it can be determined whether the UBE's work is a substantial and necessary part of the Project.

Column 1 - description of work to be done by undersigned UBE	Column 2 - dollar amount of the proposed subcontract between the bidder and the undersigned UBE	Column 3 - percentage of Bidder's base bid represented by the proposed subcontract between the Bidder and the undersigned UBE

The undersigned UBE will be ready to begin work on the subcontract on the following date: _____

Name of UBE: _____ Telephone No. _____

Address, including Zip Code, of UBE: _____ Fax No. _____

Signature of authorized representative of UBE

Title of the person who signed above: _____

What person with the UBE should the City contact with questions about this form or the proposed subcontract?

Name of individual: _____ Telephone No. _____

Title of individual: _____

Email address: _____

By submitting this form to the City of Durham, the Bidder represents that if the Bidder signs the contract with the City of Durham for the Project, the Bidder will enter into the subcontract described above with this UBE.

REQUEST TO CHANGE UBE PARTICIPATION AFTER BID OPENING

Project: _____

Name of bidder or contractor: _____

Name and title of representative of bidder or contractor: _____

Address: _____ | Zip Code: _____

Telephone No.: _____ | Fax No.: _____

Email Address: _____

Total amount of original contract, before any change orders or amendments: _____

Total amount of the contract, including all approved change orders and amendments to date, but not counting the changes proposed in this form: _____

Dollar amount of changes proposed in this form: _____

The proposed change (check one) ☒ **increases** ☒ **decreases** the dollar amount of the bidder's/contractor's contract with the City.

Does the proposed change decrease the UBE participation? (check one) ☒ **yes** ☒ **no**

If the answer is **yes**, complete the following:

BOX A. For the subcontract proposed to be changed (increased, reduced, or eliminated): Name of subcontractor: _____

Goods and services to be provided before the proposed change: _____

Is it proposed to eliminate this subcontract? ☐ **yes** ☐ **no**

If the subcontract is to be increased or reduced, describe the nature of the change (such as adding \$5,000 in concrete work and deleting \$7,000 in grading): _____

Dollar amount of this subcontract before this proposed change: _____

Dollar amount of this subcontract after this proposed change: _____

This subcontractor is (check one):

- ☒ 1. Minority-owned UBE
- ☒ 2. Women-Owned UBE
- ☒ 3. Not a UBE

BOX B. Proposed subcontracts other than the subcontract described in Box A above

Name of subcontractor for the new work: _____

Goods and Services to be provided by this proposed subcontractor:

Dollar amount proposed of this proposed subcontract: This subcontractor is:

- ☐ 1. Minority-owned UBE
- ☐ 2. Women-Owned UBE
- ☐ 3. Not a UBE

Add additional sheets as necessary.

This form is used only if the conditions described in the instructions are present.

QUESTIONNAIRE ON BIDDER'S GOOD-FAITH EFFORTS

Name of Bidder:

If you find it helpful, feel free to attach pages to explain your answers. How many pages is your firm attaching to this questionnaire? _____
questionnaire.)

(Don't count the 2 pages of this

If a yes or no answer is not appropriate, please explain the facts. All of the answers to these questions relate only to the time before your firm submitted its bid or proposal to the City. In other words, actions that your firm took after it submitted the bid or proposal to the City cannot be mentioned or used in any answers.

1. SOLICITING UBEs.

(a) Did your firm solicit, through all reasonable and available means, the interest of all -UBEs (that is, in the list provided by the City-) in the scopes of work of the contract? ☐ **yes** ☐ **no**

(b) In such soliciting, did your firm advertise? ☐ **yes** ☐ **no** Are you attaching copies to this questionnaire, indicating the dates and names of newspaper or other publication for each ad if that information is not already on the ads? ☐ **yes** ☐ **no**

(c) In such soliciting, did your firm send written (including electronic) notices or letters? Are you attaching one or more sample notices or letters? ☐ **yes** ☐ **no**

(d) Did your firm attend the pre-bid conference? ☐ **yes** ☐ **no**

(e) Did your firm provide interested UBEs with timely, adequate information about the plans, specifications, and requirements of the contract? ☐ **yes** ☐ **no**

(f) Did your firm follow up with UBEs that showed interest? ☐ **yes** ☐ **no**

(g) With reference to the UBEs that your firm notified of the type of work to be subcontracted -- Did your firm tell them?

- (i) the specific work your firm was considering for subcontracting? ☐ **yes** ☐ **no**
- (ii) that their interest in the contract is being solicited? ☐ **yes** ☐ **no**
- (iii) how to obtain and inspect the applicable plans and specifications and descriptions of items to be purchased?
☐ **yes** ☐ **no**

2. BREAKING DOWN THE WORK.

(a) Did your firm select portions of the work to be performed by UBEs in order to increase the likelihood that the goals would be reached? ☐ **yes** ☐ **no**

(b) If **yes**, please describe the portions selected. **ANSWER:**

NEGOTIATION. In your answers to 3, you may omit information regarding UBEs for which you are providing
Form E-105.

- (a) What are the names, addresses, and telephone numbers of UBEs that you contacted? **ANSWER:**
- (b) Describe the information that you provided to the UBEs regarding the plans and specifications for the work selected for potential subcontracting. **ANSWER:**

- (c) Why could your firm not reach agreements with the UBEs that your firm made contact with? Be specific.
ANSWER:

3. ASSISTANCE TO UBEs ON BONDING, CREDIT, AND INSURANCE.

- (a) Did your firm or the City require any subcontractors to have bonds, lines of credit, or insurance?
☐yes ☐no (Note: In most projects, the City has no such requirement for *subcontractors*.)
- (b) If the answer to (a) is **yes**, did your firm make efforts to assist UBEs to obtain bonds, lines of credit, or insurance?
☐yes ☐no If **yes**, describe your firm's efforts:. **ANSWER:**
- (c) Did your firm provide alternatives to bonding or insurance for potential subcontractors? ☐yes ☐no
If **yes**, describe. **ANSWER:**

4. GOODS AND SERVICES. What efforts did your firm make to help interested UBEs to obtain goods or services relevant to the proposed subcontracting work? **ANSWER:**

5. USING OTHER SERVICES.

- (a) Did your firm use the services of the City to help solicit UBEs for the work? ☐yes ☐no Please explain.
ANSWER:
- (b) Did your firm use the services of available minority/women community organizations, minority and women contractors' groups, government-sponsored minority/women business assistance agencies, and other appropriate organizations to help solicit UBEs for the work? ☐yes ☐no Please explain. **ANSWER:**